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Sent: Sunday, 2 September 2018 1:09 p.m.
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Subject: High Level Response from Trans Power for Ventus Energy Wind Farm in Kaimais Range

Chairman Directors and C. E.
O.
Trans Power NZ Ltd
Reference T.P. NZ Ltd. High Level Response to Ventus Energy Application for the Kaimai Wind Farm.

I, William Alfred Harding Electrical Systems Diagnostic Engineer, of Taupo, wish to make a Technical Submission and Appraisal as to why Transpower NZ Ltd, along with the Electricity Authority and the Commerce Commission, who Set and Apply the Rules for Generation, Transmission and Distribution for the high Voltage Grid System in NZ, **should not give** a Consent to Ventus Energy to Build their 24 Turbine Proposal on the Kaimais.
There are many good valid Technical reasons as to why this very High Level Application Response should have Finality at this Point in time, to save Time, Effort and Money, to all those Involved.

The Prime Concern for the Rules Managers, is too recognise that they can Identify the Difference
between **SYNCHRONOUS** and **ASYNCHRONOUS** FORMS of Generation.

The **SYNCHRONOUS** Forms Supply 50HZ **Only** Sinusoidal Currents Homogeneously, at one Legally set Frequency into the Grid System.

The **ASYNCHRONOUS** Forms Produce Derived Multiple **Leading Current** Harmonics **Only** from The Grid Supplied SYNCHRONOUS 50Hz Energies.

These Derived Frequencies range from the 2nd to the 50th Harmonic, encompassing Frequencies between 100 Hz to 3,000 Hz.
The RULES MANAGERS have a very conflicting Scenario facing them within the Requirements of the Electrical Generation Participating Code 2010 Guide, (Act).

This Code was Instigated with Complex RULES, based, around the Design, Calculations and Operation of the Energy System at **Only** 20 Millisecond time intervals or at 50 Hz Frequencies.

Within the last Thirty Years with the Advent of Mainly Wind Farms being allowed to Penetrate the Grid, there is now an Unofficial World Wide acceptance that all Grids, will be Classified as a Composite **Combined Two Frequency form of "Dirty Energy"** which now can be Produced, Bought and Sold as a Viable Energy Form to every Electrical Consumer, to be used within their Designed **50 or 60 Hz** Manufactured Electrical Appliances.
Within this Ventus Energy Application, and before any Enduring Statement is made from Trans Power NZ Ltd, within the short term, then for this very High Level Response from the Rules Management Team should now, **Require an Essential Government Intervention** to Legislate within the Laws Pertaining too, and as to what, will be the **Official Frequency that will need to be Enacted and Legislated for the Future use in NZ.**

This, will have an all Encompassing Reaction and Restructuring, of every Aspect of the Electrical Energy System which, will happen, if the Present Acceptance, of allowing Penetration of all forms of **ASYNCHRONOUS GENERATION**, but in this Particular case, as a perfect example, by Acceptance of this Ventus Energy Supplied Kaimai Wind Farm into the System.
For THE RULES MANAGEMENT Team of Government Departments to, in any way or form, accept or Consent to this Asynchronous Operated Wind Farm, is at the Moment, automatically breaking the NZ Law Statute's pertaining to the Generation, Distribution, Marketing and Retail of a UNIT QUANITY OF ELECTRICITY, being sold openly to the Public.

New Zealand Consumers, and the Electric Industry need the Government's Assurance, by way of a Public Proclamation, that the Existing 150 Years old 50 Hz **SYNCHRONOUS Sinusoidal Mode of Energy Production** will

still, and **Only** be the Preferred Standard Power Energy to be Reticulated and Supplied in NZ.

If, this Proclamation is announced, then the Rules Management Team has no other option, but to recommend, to the Minister of Energy and the Government, that the other Option of all Forms be it from Hydro and Wind, of ASYNCHRONOUS HARMONIC GENERATION be removed or Shut Down, from all Trans Power Common Coupling Node Point Connections.
This is on the Technical Basis, that the Terminal Output Production of Multiple Leading Current of Harmonic Frequencies, is not Operationally Compatible and does not Comply, to the Existing NZ Law Statutes.

If, the above Proclamation is not made, then, the Rules Management Team of, the **Electricity Authority, Commerce Commission, Business Innovation and Employment, and Trans Power** NZ Ltd, is staking **the Claim** and being the **Cornerstone**, of Supporting and Encouraging on a Daily and Hourly Basis, the Expansion of one of the **Largest Scam and Corruption Operations** against every NZ Citizen and Electrical Consumer.

The Consequences of no Proclamation being made is that;
The Government and the Rules Management all believe in the Concept that Wind Farms “MAKE AND PRODUCE USEABLE POWER”. This Concept has no Technical Truth or Validity.

If the Wider Issues Mentioned above, are not Implemented, then the **Two Frequency System of Supply, will be Classified as Being the Norm for New Zealand into the Future.**
Within that frame of Reference, then the Technical Application of Ventus Energy should be tested within the Ancillary Service Provisions, which needs Investigation and a Technical Appraisal.

The BLACK START and FAULT RIDE THROUGH CONCEPT, is their Weakest Points.
In most cases all Wind Farms are Embedded Operations, with a Node Point of Supply from the National Grid Synchronous Supplied Energy at the 50HZ Frequency.

Other than the Rare Permanent Magnet Induction Motor Model that is available, all others cannot produce any Sustainable Voltage at a Frequency Speed that Could be Properly Controlled and SYNCHRONIZED WITH THE SYSTEM.

For the Operational and Technical Fact, that by just being in a Close Vicinity of the Synchronous Speed when a Circuit Breaker is closed, Is then Confirming the Rationale, of an Asynchronous Operation that Operates with an Uncontrolled Speed Variability within the availability and Intermittency of Wind Strength.
The Uptake of using the Wind Strength to drive the Blades Mechanically above the Synchronous Point of the Grid System at equivalent 50HZ Speed, once this happens, then **NOTHING MORE CAN BE Achieved** but, to Cut and Distort the 50 Hz Electromagnetic Field Energy that Supplies it. Nudging the Speed Upwards, through changing the “attack Angle” of the Blades, will Proportionally increase the Production of Leading

Current Harmonics Energies back into the Grid Connection System that is Supplying it, subject to Frequency Load Impedances.

The Rules Management Team appears to believe, that this Proportionally Increased Leading Current Harmonics that can only ever be derived through the 50 HZ Grid Portal, is Actually Useable Energy when it is **Only a Derivative Produced Energy**.

The Government and the Total Electrical Rules Management Team on the Above Mentioned Derivative Energy, should Stop Advertising and Promoting Nationally, within Graphical or Comparing Forms, that this Derivative Energy form, is Equal in Megawatts to the Standard 50hz Synchronous Supplied Energy.

This is False Advertising at the Highest Level, which is not Compliant within the NZ Consumers Guarantees Act.
The Ventus Energy Claim, that this Wind Farm will Supply 27,000 Homes with 50HZ Energy, is not a Provable Fact, and is again False Advertising.

The Problems with Integration of the Wind Farms into the Grid System

Essentially, had the World and Trans Power NZ Grid Controllers used all their Revenue Metering Measurement Devices with effective 50 HZ Band Pass Filters Attached to all the Functional Revenue Metering Monitoring of 50 Hz Energy, **NO WIND FARM WOULD HAVE EVER BEEN ESTABLISHED.**
As it would have then Expose that their Terminal Outputs would only have ever indicated the Normal 50 HZ Frictional and No-Load Losses associated as a Normal Three Phase Induction Motor within variable ranges of speed, at all Times.

All Wind Farms, are Classified and Just used as, Intermittent Wind Assisted variable speed Three Phase Electric Grid System Frequency Modulating Induction Motors, that always Produces Leading Harmonic Derivative Energy for Sale.
This Leading Current Harmonic Energy Produces and Overlays the Grid System with an **Uncontrolled, and Unreliable** Form of High Frequency Plasmatic Energy, that can be Identified and Shown by the Flickering of Carnival Light Displays as shown at Taupo every Night, which is supplied by the Three Hydro Asynchronous Generators on the Hinemaia River Hydro Stations.

DETOUR
On this Note the Writer would like to share his experiences with the Rules Management Team, with an Explanation of Knowing all about the Downfalls of having Asynchronous Forms of Generation within the Mix of Supply.
A very Salient turning point of **Discovery**, occurred as a small window of opportunity presented itself.

The Town of Taupo in the late 60's was Developing Very Fast, the Council took the advice of Leading Consultant John Noble and Associates to expand their Embedded Hinemaia run of the River, Hydro's to Install Three Asynchronous Generators Ha1, (1MW), HB (1MW) and HC (2.2MW) to join with a Synchronous HA2 (1.2MW).
Wairakei Power Station which was to the North, at that time Supplied Taupo via the Taupo Rununga Substation from one 33kv Feeder.

As the Taupo Electricity Systems Test Engineer, I was approached by the Fletcher PLYCO Electrical Engineer, to explain what was happening to the Factory Electric Supply.
The Previous two years TEL had slapped Penalties onto Fletchers PLYCO, for not ensuring their Factories Power Factor, was within the TEL Limits. They, immediately reacted by expanding their 7 Tapped Capacity bank up to a 14 Tapped Capacity Unit.
The Engineer was concerned, that the Previous Years Operation was very Stable, with the Taps normal position of 10 was now changing down to tap 3, and as a 24 Hour Non- Changing Operation this needs some explaining for spending $30,000 at the T.E.L. request.
I then accompanied him to the Factory Floor. On investigating the Taps Timing of Variations and Durations, my suspicion was aroused as they Coincided Closely with the Stop-gap Operation of our Hydro Generation Schedules.
As it was 2 P.M in the Afternoon, I Contacted the TEL System Operator to start up the Larger HC 2.2 Mw Station.
The Power Factor Reading was at the start on Tap 11.
“Increase HC to 1.1 MW” No Tap Change.
“Increase HC to 2.2 MW”, suddenly, the Taps Stepped Downwards to settle at No 2 Position.
My initial thought was that this was an Impossible situation.
I reversed that Order Twice, which returned, exactly, the same results. Which then proved that Changing the Dominant HC Asynchronous Power Station Loading Set Points, situated 30 Km’s away from this Factory, directly affected a steady state Factory Load Power Factor Correction Operation.

Coinciding the Factory Operational Charts, with TEL Generator Schedules, gave the Proof that within certain Loading Situations, but by in Large the Asynchronous Generators was Saturating the Taupo Supplied Reticulated area with an Excess of Capacitive Leading Currents. This was not due to an Ordinary V.A.R. Over Excitation Change, as this HC Machine has no Excitation attached, as it is an Ordinary Three Phase Induction Motor, but its Transient Effects was simply due to Increasing the Water Turbine Speed that Produced Increasing amounts of Leading Harmonic Derivative Energy.
This, today is not overly repeatable, as this Window of Opportunity Closed when 2 extra Tie Lines were Installed From the Wairakei Geothermal

Power Station, including a Taupo Bypass Line from Taupo South Substation.
Within this newly acquired Technical and Operational Knowledge, then, explained why after many years of having Experiencing the Commissioning of Normal Large Synchronous Hydro Generators within the NZED Environment, my introduction to the Technical Frailties and Weaknesses Associated with the Asynchronous Forms has given me a Unique Engineering Exposure as to why the T.E.L. Protection Systems in many instances of simple 11Kv and 33kv Faults Operated Indiscriminately and Over-reached every time, into the Next Time Zones, which had Extended to the Wairakei Supply 5 Times causing Taupo to endure Total Blackouts.
This then, also has aligned with the Historical Total Cascaded Outages experienced within the State of South Australia three Times within the Last year and the Total U.S.A Twice in 2015, when Investigated had found Lightening has been struck near a line that has Asynchronous Generators attached to them.

There is no Known Algorithm or Protection System that can Give any Secure System Discrimination from Multiple Asynchronous Wind Farm or Hydro Sites, that would ensure the Security of Supply.

This is a tricky Problem of Identification and Mitigation needing cushioning action to be taken, where any Directional Overcurrent Protection is Involved with any Asynchronous Forms of Generation being Presented for the Settings of Discrimination Protection.
Within this Frame of New Knowledge, I experimented by Placing 50 HZ Active Band Pass Filters on the Three Asynchronous Hydro Generators Revenue Meters.
In all cases, once the Machine O.C.B. was closed, there were negligible rises of KW Outputs noted from zero to 100% gate opening, other than the Steady No-Load Current including Windage Losses from Operating as a Normal Standard Three Phase Induction Motor.
This had a very **Profound Moral Affect** on me, Knowing and Proving that **John Noble and Associates**, had hoodwinked the Council into believing that these Three Generators would ever Supply Useable Legal Power, when in fact they are **COMPLETELY USELESS to the TAUPO CONSUMERS** and at the same time created Technical and Operational headaches, of the Security of Supply Issues.

As, then Married with a young Family to support, I Morally Capitulated to leave the Status Quo as it was for the next few years.
I was very thankful and Technically Relieved when Trust Power bought out T.E.L. and made me Redundant, which then allowed me to explore a different Field of Employment, which was a Holiday Park.
Having now sold that, and returning to Taupo as a Consumer again, my T.H.D. (total harmonic distortion) Levels at my home Meter

always Registers around 25 to 30%, which means, that is the level my Revenue Meter is forcing me to Pay Trust Power and the Retailer over and above the Normal 50Hz Load energy used to supply me with Dirty Derivative Energy.

PROLOGUE OF FINAL THOUGHTS

Within my Very Unique, and Wide Work Experience associated with Synchronous and Asynchronous Forms of Generation, AND after Travelling around the World Checking out Wind Sites and Listening to the Horror Stories, primarily around the Electromagnetic Currents Traversing in and around the ground of Wind Farms, due to Unbalanced Positive Negative and Zero Asymmetrical Sequence Currents leads me to Realise.
That this is perhaps the Opportunity, to continue my Passion of informing those that have the Responsibilities and Power to Change the Electrical Power Energy systems to an everlasting Synchronous Option of good Quality Electricity.
Firstly, the World Societies have no reason to suffer the Vagaries of supporting the Production of an Energy Form that they cannot ever Use or Utilise Legally.

Secondly, now knowing through Practical Experience, the Future Repercussions of the Systematic Degradation and Destroying of the Top Notch 50/60 HZ Synchronous Power System, which, is the only Energy Form that is ever Capable of Further Stabilised Expansion, being now replaced by an Intermittent Unstable Asynchronous Form, along with being pushed by Governments and by Individuals who **Know Nothing** about how a reliable 50HZ System Could Operate in the Name of Climate Change, or Profit Motives.

Thirdly, as a now Retired 80 year old System Diagnostic Engineer, where for over 5 Years as a Systems Engineer I carried a Hidden Moral Burden,

for what I thought was my only Option at the Time and not to rock the boat, to protect my own Moral Demise with a loss of position and Status.
I have now no regrets, because Obviously this Ventus Energy Wind Farm Application has given me another Chance to do what I maybe should have done all those years ago, and Correct the Worlds Perception, that Society, if they persist going down the path of Installing More Asynchronous Wind Farms, with Two Frequency Standards being Officially Allowed, then it is a Pathway to Total Disaster.

End of My Technical Meandering.
For the Ventus Energy Application to be given any High Level Response Consent to Operate, by Trans Power NZ Ltd, is of Concern.
There are many Negative Features Associated with the Integration of the Kaimai Wind Farm, particularly with the use of Nameplated (Motor Induction) Data Rating of 100 MW at 50 HZ, then being used as a Supplier of 100 MW Harmonically Distorted Dirty Energy.
At what Specific Frequency of Current, would Ventus Energy use to Pinpoint Plots on a Protective Discrimination Curve.
How could the Fault Ride Through Capability be achieved with no Dynamic Voltage Excitation Equipment not being made available, to correct and stabilise the System, and at the same time to supply Capacitive and Reactive Currents to support and Manage Transient Deviations within a time scale of Seconds.

And how would these Turbines Manage and React to Frequency Excursions between 49.8 and 50.2 HZ when all they can Produce is Multiples of Frequency between 100 HZ and 3,000 HZ.
But Definitely not 50 Hz.

Transpower, should never accept from Ventus Energy, any Results Presented to them from Computer Simulation Studies on how their Wind farm will Perform within the Kaimai Environment, as the Algorithm, can be spiked, not, to Include the whole 24 Turbines Operating at any one Time Period.

As a Conclusion, to an Official Submitted Objection, against Ventus Energy getting an Official Approval, I would expect to be given the Opportunity to defend my Argument in Person, but only if Trans Power sees fit to grant them an Operating Consent and Licence.

Otherwise, if not, then Trans Power and the Ruling Management Team has succumbed to some good old Common Sense with an Outcome that will be the Best for the NZ Consumer and the Countries Taxpayers and the Forum of the World.

Yours Sincerely

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This Paper will be forwarded by email to the other Rules Manager Team Members C.E. O.'s also to Minister of Energy and Prime Minister.