IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of Horizons Regional Council's 'One Plan' Section 32 Cost Benefit Analysis

STATEMENT OF EVIDENCE OF KIERAN O'NEILL MURRAY

BACKGROUND AND EXPERIENCE

1. My full name is Kieran O'Neill Murray. I hold a Bachelor of Commerce degree and a Postgraduate Diploma in Economics from the University of Otago. I am a Managing Director of LECG Limited, a subsidiary company of LECG, LLC, an expert services firm with over 800 experts and professional staff. LECG has offices in the United States, Europe, Asia, and New Zealand. I am a member of the senior executive team for LECG's global energy and environmental practice

2. I am a professional economist; I provide advice and expert analysis in the areas of regulation, public policy, institutional structure and market analysis, with a particular focus on the energy and natural resources sector. I have served as an economic consultant on these matters in New Zealand, Australia, Canada, the Philippines, Singapore, Tonga, the United States, and Vietnam.

3. I have given expert evidence on matters associated with energy markets and public policy before Select Committees of New Zealand's House of Representatives, the High Court of New Zealand, the New Zealand Commerce Commission, the (former) National Electricity Code Administrator in Australia, the Australian Energy Market Commission, the Australian Competition and Consumer Commission, the Energy Regulatory Authority in Singapore, the Energy Regulatory Commission of the Philippines, and presented to the Federal Energy Regulatory Commission of the United States of America.

4. My public-policy experience includes being the Economic Adviser to the Leader of the Opposition; a member of the Prime Ministerial Task Force on Targeting Social Assistance; Economic Adviser to the Minister of Finance; and adviser to the New Zealand Treasury and the State Services Commission.

5. I have read the Environment Court Consolidated Practice Note 2006 and have complied with the Code in preparing my statement of evidence. I understand that as an expert witness I have an overriding duty to assist the Hearing Panel impartially on relevant matters within my area of expertise. Except where I state that I am relying upon the specified evidence of another person, my evidence in this statement is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions which I express.

SCOPE OF MY EVIDENCE

6. Horizons publicly notified a single resource management plan referred to as the "One Plan" in May 2007. The Plan is intended to be an integrated planning document to manage the Manawatu-Wanganui's natural and physical resources. It focuses on four issues, two of which are surface water quality degradation and increasing water demand.

7. Dr Thomas Brent Layton provided a statement of evidence on behalf of Fonterra Co-operative Group Limited on 17 June 2008. In his evidence, Dr Layton makes various claims in relation to the efficiency consequences of what he terms the "hydro-generation preference" reflected in Policy 6-16. In particular, he compares the value of retaining water in stream for use in hydro-electric generation with the value of that water when used for dairying,

including for irrigation. He concludes that "This analysis shows that the value of water used in industry and for irrigation of horticultural and dairy farms can be considerably higher than its value for hydro-generation" (p.18). In this brief, I review Dr Layton's analysis, and make the following observations:

(a) Dr Layton appears to compare marginal values for water use in hydro-electric generation with estimates of average value for water used in dairy farming. This approach is flawed because the comparison is not "like-for-like".

(b) An estimate of the average value of water used in dairy farming does not explain the change in value of diary production from a change in the availability of water – farmers could be expected to have curtailed their *least* productive use of water where less water was available to them than they would like.

(c) Dr Layton bases his conclusion on an NZIER study that estimates values for water in the Canterbury region; in my opinion it is highly doubtful that the values for water in Canterbury would be the same or even similar to the values for water in Horizons, both for irrigation and for hydro-electricity generation.

(d) The reasons water values would differ between the two regions include differences in rainfall patterns and soil types and different electricity generation infrastructure.

(e) Dr Layton does not appear to have considered various technical issues in the NZIER report, including the selection of dairy farms used in the sample.

8. In my brief, I also consider Dr Layton's application of equity criteria in assessing the Horizons regional plan. His application of this criterion appears to have no basis in the RMA and in any case his conclusion on equity appears inconsistent with the principles to which he refers.

HYDRO-GENERATION PREFERENCE

9. Policy 6-16 concerns core water allocation and minimum flows. The notified version of the Policy states that:

(a) The taking of surface water shall be managed in accordance with the minimum flows and core allocations set out for each *water management zone** in Schedule B. (The asterisk is in the original Policy and refers to a particular zone.)

(b) The minimum flows and core allocations set out in Schedule B shall be assessed after any takes for hydro electricity generation have been taken. The only exception to this will be the hydro electricity takes from Zone Wahu_3c.

10. The version of the Policy containing recommended changes as the result of Officer Reports states:

(a) The taking of surface water shall be managed in accordance with the minimum flows and core allocations set out for each *Water Management Sub-zone** in Schedule B. (The asterisk is in the original Policy and refers to a particular zone.)

(b) The minimum flows and core allocations set out in Schedule B shall be assessed after any takes lawfully established at the time the Plan becomes operative for hydro electricity generation have been taken.

11. Both versions of Policy 6-16 thus establish a preference for hydro-electricity generation over other takes. Dr Layton argues (at para 49) that such a preference must be underpinned by an 'incontrovertible' superior value compared to all other potential uses:

> "*For this preferential ranking to be an appropriate policy under the RMA, which emphasises efficient resource use, it needs to be incontrovertible that the value of water in hydro-generation is always greater than its value in all other potential uses by the community.*" (emphasis added)

12. However, efficiency is but one of the many criteria that the person or entity preparing an evaluation under section 32 of the RMA must take into account. In addition to efficiency, the evaluator is required to examine effectiveness and consider the extent to which the purpose of the Act is achieved. The purpose of the RMA (section 5) is to promote the "sustainable management of natural and physical resources." Sustainable management is defined as "managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety."

13. This purpose statement incorporates a wide conception of sustainability. For this reason, policies need not always or necessarily be aligned or compatible with a pure efficiency criterion. In my view, the absolute or "incontrovertible" standard asserted by Dr Layton is therefore inappropriately rigid for the purposes of the RMA. The RMA recognises that there are numerous uses for water that should be factored into a section 32 analysis.

NZIER STUDY

14. In assessing whether the policy encourages efficient resource use, Dr Layton compares the value of water used for hydro-electricity generation with water used in other ways. He does so by referring to an NZIER report which estimates the average value of water in the Canterbury region across the competing uses (which I will refer to as 'the NZIER report').[1] The competing uses considered in the NZIER report include *"…dairy farming, sheep/beef farming, arable cropping, horticulture, hydro generation and industrial/commercial use*" (p.3). Based on the values obtained in the NZIER report he states that *"…the value of water used in industry and for irrigation of horticultural and dairy farms can be considerably higher than its value for hydro electricity generation."* (p.18).

15. The NZIER report compares the average production of irrigated vs. non-irrigated dairy farms in the Canterbury region, calculates the value of water used in irrigation on the basis of the difference in farm productivity and a range of assumptions about capital and operating costs, and then compares the average value of irrigation water with its value in alternative uses, including hydro-electricity generation. The key finding is an estimated average value of water use in dairy farming of $0.15/cubic meter, compared with a value of $0.04 - $0.16 in hydro-electricity generation.

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[1] Valuing Water : Investigating the Relative Value of Water in the Canterbury Region (NZIER, February 2006)

16. The implicit assumption which underpins this analysis is that the NZIER evaluation of alternative water use compares "like with like" and that the estimates of the value of water contained in the report are essentially correct and contain the full range of relevant values.

17. Based on the findings of the NZIER study, Dr Layton asserts that from an economic efficiency perspective, the assumption by Horizons of the superior value of using water for hydro-generation is not correct and that Policy 6-16 is very likely to result in an inefficient use of resources.

18. I consider that there are fundamental difficulties with the conclusions reached by Dr Layton. The NZIER report was prepared for a different purpose to the purpose for which it is used by Dr Layton and the report contains several methodological flaws that make it unsuitable to support the claims made by Dr Layton in relation to the Horizons One Plan. I discuss these flaws in the following sections of my evidence.

COMPARING MARGINAL VALUES FOR WATER WITH AVERAGE VALUES FOR IRRIGATION

19. In paragraph 34 of his evidence, Dr Layton labels as a shortcoming the failure of the Horizons' section 32 analysis to compare *relative* costs of competing approaches. In accordance with this relative approach, the NZIER report appears to estimate a marginal value of water for water use in hydro-generation. That is, it attempts to estimate the dollar value of electricity lost if a unit of water was taken from hydro generation:

"One useful way of considering the value of water to hydro generation is by estimating the foregone value of electricity resulting from the removal of a certain volume of water from use in generation. Previous analysis by NZIER used in investigating the impact of the Waitaki catchment plan[2], has estimated that the loss of 3 cumecs (cubic metres of water per second) through the Tekapo and Ohau Stations is approximately equivalent to 75 GWh of potential generation annually" (emphasis added) (p. 11 in the NZIER report)

20. However, Dr Layton appears to compare these *marginal* values for water use with estimates of the *average* value for water used in dairy farming. The calculation for the value of water used in irrigation in the NZIER report has the following steps (at p.6 in the NZIER report):

"Net value = output (kg MS/ha) x payout ($/kg MS) less capital costs less operating costs

Net value per cubic metre = net value divided by water use in cubic metres"

21. These calculations provide an estimate of around of \$0.10 /m^3. This is an estimate of average value.

22. Dr Layton therefore appears to be considering average prices on one side of the range when considering the value of water for dairying and marginal prices on the other side to estimate the value of water to hydro. I consider that this approach is flawed because the bounds are not compared on a like-for-like basis. Further, the analysis is inaccurate because it does not take into consideration the value of water at different points on the supply curve.

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[2] A Review of the Draft Waitaki Catchment Plan – Report to Major Electricity Users Group (NZIER, April 2005).

23. A valid comparison of the value of use of water would seek to compare relative values of water among potential users on a marginal basis, stating clearly what the flow of water through each control point would be under each scenario. A recent decision by the Hearings Committee for the Waikato Regional Council considered attempts to compare average values for irrigation against the marginal value of water for electricity generation to be "a critical issue" (section 11.9, 6b, page 118).[3]

24. If I have understood Dr Layton's approach correctly then I too consider this to be a critical issue; analysis which compares average with marginal values cannot support conclusions on the relative values of water in Canterbury and certainly not elsewhere. This is because an estimate of the average value of water used in dairy farming does not explain the change in value of dairy production from a change in the availability of water – farmers could be expected to have curtailed their *least* productive use of water in circumstances where less water was available to them than they would like.

VALUES OBTAINED FOR CANTERBURY CANNOT BE ASSUMED TO APPLY IN THE HORIZONS REGION

Different generation volumes

25. Dr Layton discusses the values of water estimated in NZIER report for Canterbury in the context of his evidence for Horizons, implying that the values are readily transferable. It is highly doubtful in my opinion that the values would be the same or even similar, both on the irrigation side as well as for hydro-electricity generation.

26. As far as hydro-electricity generation is concerned, the value of water is estimated by calculating the reduction in electricity generated, for a given amount of water, and working out a dollar value for that lost electricity generation. However, neither the quantity of electricity generated, for a given volume of water, nor the dollar value of that electricity would be the same in the Horizons region as in Canterbury.

27. First, one would expect that the amount of energy produced by the Tekapu and Ohau stations for a given volume of water would be different from the generation that would be lost if the same volume of water were displaced from the Tongario diversion and consequently the Waikato hydro systems.

28. Second, the dollar value of a unit of electricity at Benmore (the reference point used in the NZIER study) in the South Island is not the same as the dollar value in the Waikato because of transmission losses and constraints.[4] Nodal prices in the Waikato are generally higher on average than at Benmore, by around 20%, though in some years the variance has been closer to 50% and in dry years, such as 2008, prices at Benmore may be higher than in the Waikato.

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[3] 'Proposed Waikato Regional Plan: Proposed Variation No.6 – Water Allocation: Hearings Committee Report: Volume 1, dated 15 October 2008.

[4] Wholesale electricity is pricing on a nodal basis, and prices may vary between nodes to reflect transmission losses and congestion.

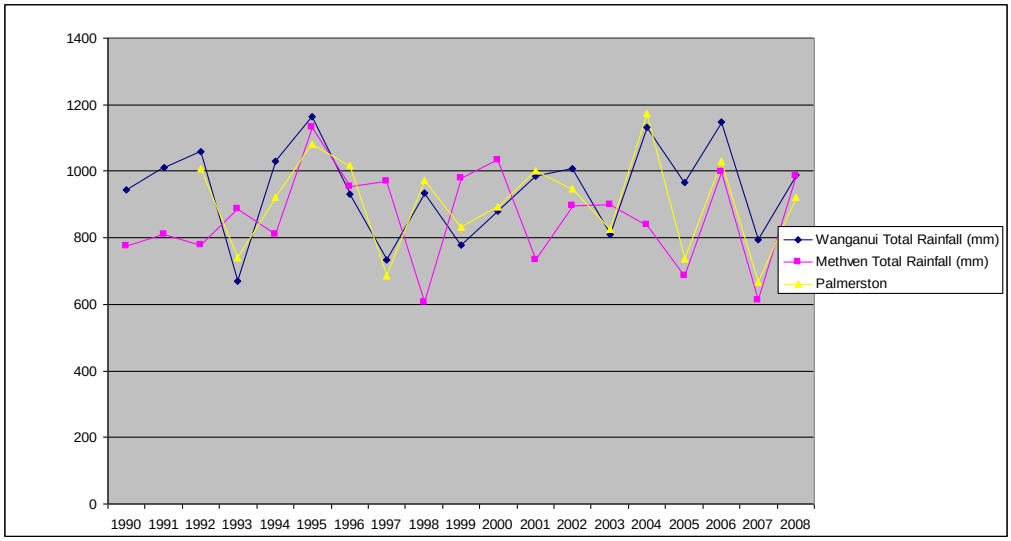
Differing farming characteristics

29. The value of irrigation in Canterbury would likely be different to the value in the Horizon area. For example, there are differences in soil types and rainfall levels, both of which would seem to be non trivial factors related to the value of water in dairy farming.

30. Rainfall: The graph below shows the total rainfall for the Horizons' region (Wanganui and Palmerston North) and for the Canterbury region (Methven) over the 1990-2008 period. The variability between the two regions is clear, with rainfall in the Canterbury region lower than that of Wanganui over most of the period sampled; in several years, the difference exceeds 200 mm.[5]

31. This difference is clearly material in the context of the base case quantity referred to in the NZIER report in which use of water is 5,850 cubic metres per year (averaged over two types of dyke and spray irrigation). Given that 100 mm of annual rainfall is equivalent to 1000m^3 of water per hectare per year, the difference in rainfall between the regions corresponds to a difference of between 14% and 32% of the average base case quantity. In the context of the report this would seem to indicate that the value of water in Canterbury might exceed the upper bound of $0.16 per cubic metre estimated by Dr Layton by an amount sufficient to make the direct comparison between the two dangerous.

Figure 1: Total annual rainfall (mm), Selected regions 1990-2008



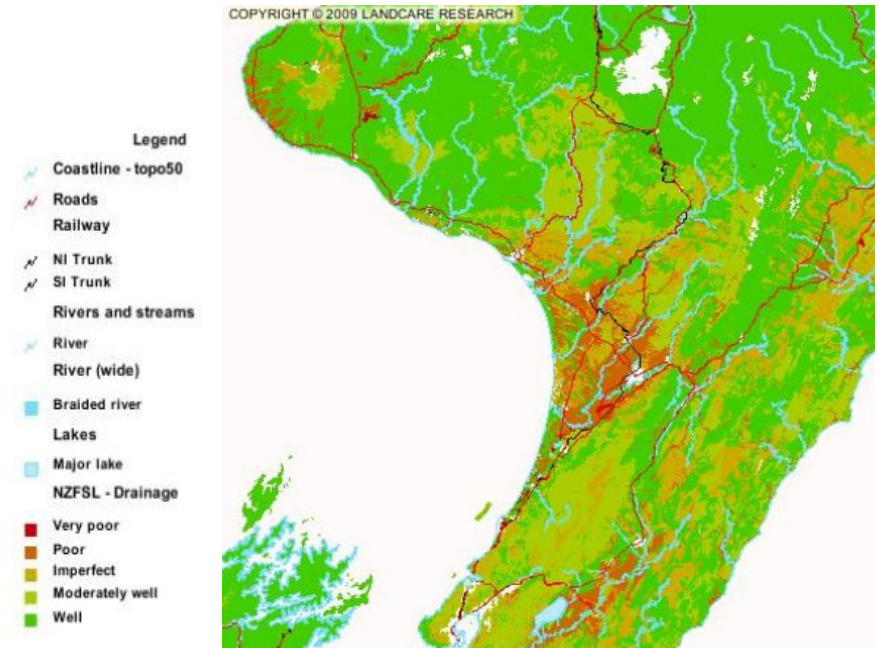
Source: NIWA (National Climate database), Palmerston North data commences in 1992

32. Soil quality: Two indicators referred to by Landcare research in its mapping research[6] are useful to observe to describe the soil in Canterbury compared with the Horizons region. The drainage class and the potential rooting depth are shown in the graphs below for the two regions.

[5] In particular, rainfall was higher in Wanganui compared with Methven in all but six of the years. To take an average over the remaining 13 years for the two regions, the difference is approximately 192 mm between the regions. Considering the total 19 years of data, the difference is an average of 83 mm more rainfall in Wanganui.

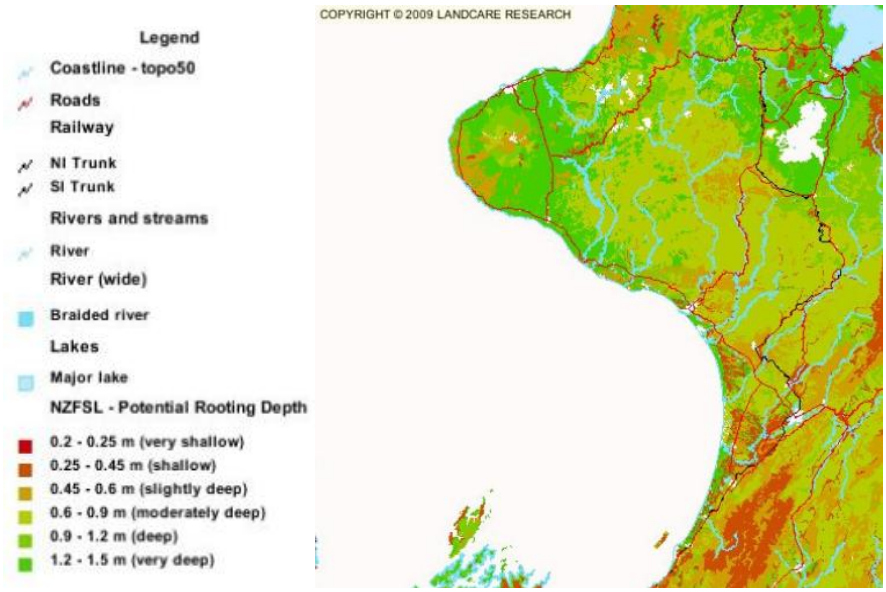
[6] http://gisportal.landcareresearch.co.nz/WebForms/map.aspx

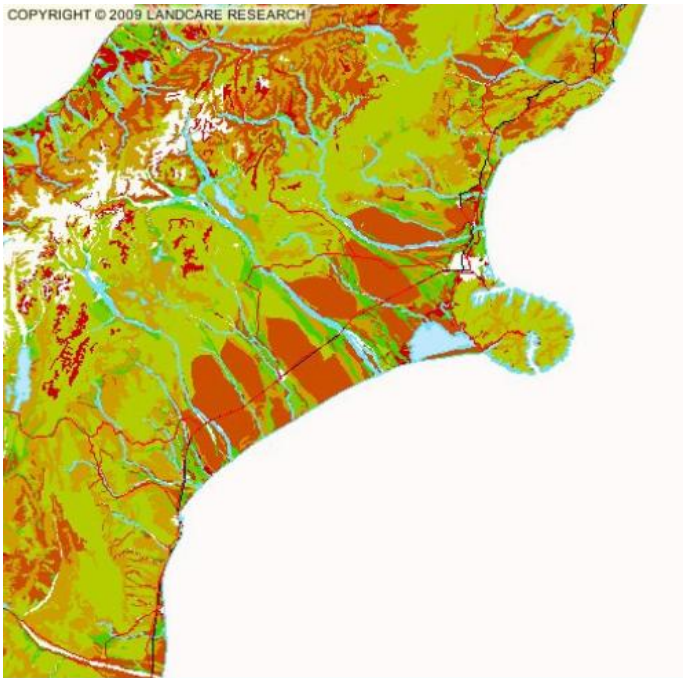
Figure 3: New Zealand fundamental soil layer – drainage class



33. The drainage class identifies the natural drainage condition of the soil. It refers to the frequency and duration of wet periods. The noticeable difference is the higher quality class in the ensemble of the Canterbury region shown by the relative domination of the bright green regions compared with the Horizons region. This would logically indicate that Canterbury's soil differs in its degree, frequency and duration of wetness, all of which would seem to influence its use for various uses.

Figure 4: New Zealand Fundamental Soil Layer - Potential Rooting Depth





Source: Landcare New Zealand[7]

34. Similarly the above figure shows that Canterbury in its ensemble is characterised by shallower soil depth than the Horizon region. MAF indicates that for good irrigation management, a range of application depths may be required and that required application depths depend primarily on soil water holding capacities and crop rooting depths.[8]

35. Canterbury's soil therefore appears to differ from that of the Horizons' region. Although this is not a subject within the domain of my expertise, I would expect this difference to have implications for the quantity of irrigation required

[7] http://gisportal.landcareresearch.co.nz/WebForms/Catalogue1.aspx
[8] Best Management Guidelines for Sustainable Irrigated Agriculture MAF Policy Technical Paper No 00/05 June 1997

and therefore for the relative value of water. Certainly, the differences point to a danger in the use of a direct comparison of water values between the two regions as Dr Layton has assumed.

36. Because of these fundamental differences between both irrigation and generation in Canterbury and the Horizons regions, the NZIER study of water value in alternative uses in Canterbury is essentially irrelevant and meaningless in the context of relative water values in the Horizons region:

- there are material differences *inter alia* in rainfall and soil types and related farm productivity and thus, Dr Layton's estimated value of water in Canterbury irrigation is equally inapplicable; and

- there are substantial differences in quantum and price of hydro-electricity generation and thus, Dr Layton's estimated value of water in Canterbury hydro-electricity generation is inapplicable.

37. In addition to these fundamental conceptual problems with the NZIER study, I have a number of technical reservations about the study methodology which in my view further erode its suitability for the purpose proposed by Dr Layton.

TECHNICAL ISSUES

Valuing water used for dairy

38. The NZIER report bases its value of water on a comparison of dairy farm productivity between irrigated and non-irrigated farms; the implicit assumption presumably being that the only difference between the two types of farms is the use of water for irrigation. This assumption is most surprising given the likely heterogeneity of farms in the sample. Different rainfall, soil types, capital intensity, to cite three examples, are likely to be non-negligible factors that influence productivity in addition to the use of water and which do not appear to have been considered by Dr Layton in forming his view. In view of the highly productive nature of dairy farming in New Zealand, it would seem reasonable to assume that if a dairy farm is not irrigated, then there would be material reasons to explain that choice. Such reasons would influence its productivity and would need to be considered to confidently understand the differences in productivity between irrigated and non irrigated farms.

39. To assess the value that irrigation water contributes to farm output, I believe it would have been more meaningful to compare the productivity of specific individual farms pre and post implementation of irrigation systems.[9]

40. Secondly, it is difficult to assess the validity of NZIER's assertion (p4, NZIER report) that *"we can be confident [at a 95% level of significance] that the difference observed between the average output per hectare of irrigated and non-irrigated farms is material and genuine, rather than being the result of a random sample*". An assessment of this statement is difficult because the data used in the study are poorly documented. Beyond the statement that individual farm data has been supplied by Fonterra (page 3), no information about the data set or the sampling methodology has been provided.

[9] In this respect, the approach taken by Andrew MacFarlane in his evidence to the Canterbury Regional Council in the matter of Central Plains Water Trust appears preferable to that taken by Dr Layton. Mr MacFarlane estimates the change in profitability due to irrigation by looking at typical farms types before and after irrigation and preparing budgets for each type.

41. According to Tait & Cullen, there are around 700 dairy farms in Canterbury;[10] visual inspection of the data points in Figure 1 (page 4) suggests that the data set represents well over 100 but probably less than 300 farms. The specific sizes of the sub-samples (irrigated and non-irrigated farms) have not been provided. However, visual inspection of Figure 2 (p.5 of the NZIER Report) indicates that the sample of non-irrigated farms contains 40 data points; the number of irrigated farms is not determinable from Figure 2. The raw sample size therefore is highly likely to comprise a substantial proportion of the entire study population.

42. However, whether that sample is statistically *representative* of the population (and thus, allows us to draw conclusions about the characteristics of the entire population with confidence) depends far less on the raw size of the sample than on the method by which the sample has been selected. Unfortunately, the NZIER study contains no information on the sampling procedure whatsoever. It is not clear whether the sample has been drawn at random, whether it has been stratified in some way (perhaps due to rainfall or soil characteristics), or whether it contains merely those farms for which data happened to be readily available. Moreover, it is not clear whether the data set has been properly cleaned to remove atypical or non-representative farming operations (such as semi-commercial or "life-style" farms) which could skew or bias the results considerably; this is particularly important in a small sample like the one for non-irrigated farms where the presence of just a few outliers might affect the mean farm output heavily.

43. From a statistical perspective, a robust sampling methodology is highly relevant: statistical tests of significance depend on critical assumptions about the nature of the distribution of the total population (e.g. normally distributed), and a robust and transparent sampling procedure that will replicate that distribution. If the sample does not replicate the population distribution, or if that underlying distribution does not fit with standard statistical assumptions, then any tests for "statistically significant differences" are largely meaningless.

44. In the absence of any information about the sampling methodology, I cannot share NZIER's confidence in the statistical significance of the observed difference between irrigated and non-irrigated farm outputs.

45. I also have reservations about the inferences NZIER draws about productivity differences between irrigated and non-irrigated farms at the low productivity end of the spectrum. The statement that *"…lower productivity non-irrigated farms may gain more from the shift to irrigation than do higher productivity non-irrigated farms"* (p.5 of the NZIER report) appears to be made essentially on the basis of the two graphs in Figure 2 of that report (p. 5) which plot farm productivity (kg MS/ha) in the form of bar charts. NZIER refers to a "*more pronounced bulge*" at the lower end of one of the two graphs, that is, the author made a visual comparison of the two graphs. The problem with this visual comparison is that the two graphs quite clearly use *different scales* on the horizontal axis (although the axis is not labelled at all, it appears to show a vertical bar for each single observation). However, the graph for non-irrigated farms plots 40 bars over a distance of 6 centimetres while the graph for irrigated farms plots perhaps over 200 farms over the same 6 centimetres. Thus, the graph for irrigated farms is visually compressed and distorted which may conceivably account for part or all of the observed visual effect of a "more pronounced bulge".

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10 Tait, P and Cullen, R (2006): Some External Costs of Dairy Farming in Canterbury.

46. A more appropriate and visually more informative and reliable way of plotting the distribution of farm productivity graphically would have been to plot both distributions on the same graph, but with data assigned to productivity ranges or "bins" on the horizontal axis and the number of observations in each bin plotted on the vertical axis. If the number of observations is expressed as a percentage of the sub-sample, then the scaling problem as a result of the differences in sample size disappears. We would therefore have readily comparable distribution curves showing the general shape (presumably some sort of bell curve), differences in mean and median, the length of the tails at either end of the productivity spectrum, and any skewing in the distribution.

47. Thirdly, the net value calculation for the value of water used in irrigation is opaque and somewhat misleading. The calculation results in an estimate of an average value of water of \$0.10 /m^3. This is a weighted average irrigation value over two types of irrigation (border dyke or spray).

48. In order to make a valid comparison on the basis of average values, the value of water should be a net value which takes into account all economic costs. It is not clear from the report what costs were used to estimate the net value. For example, specific rents or the return to non-water fixed factors (e.g. owner equity, managerial input) are absent. If this has not been included then the average value is over-estimated (as discussed earlier, the calculation and comparison of average values with marginal values is in any event inappropriate).

49. As a final point, the net value calculation uses "assumed water use", sourced from actual water use figures for the Canterbury region. The source of this information is not specified, nor is the basis for this water use. It is plausible that the water use on a dairy farm depends among other things on the state of the infrastructure as well as on the price of water. No such information is given, nor is the period for which the information was taken. If water used is provided at zero price it would be reasonable to assume that farmers would be inclined to keep irrigating as long as there is a marginal output gain; conversely, if farmers have to pay for each additional unit of water, their use patterns may be quite different. This information is particularly important in light of the sensitivity of the model to the volume of water used. For example, the report in table 2 states that 50% less water used causes the average value of water to increase by 124% (p.6 of the NZIER report).

50. For all of the reasons I have set out above, I have serious reservations about the validity of the estimated value per cubic metre of water for dairy irrigation which Dr Layton has relied upon to form his view.

Valuing water used for hydro-electricity generation

51. The NZIER report values water by presenting a range of prices from \$0.04 to \$0.16 (p.13). The lower bound is based on the average electricity spot price at the Benmore node for the period 1996 – 2006 and as such is a long-run historical average value. The upper bound, in contrast, is the short-run alternative 'trigger price' of generating electricity at Whirinaki to replace a unit of water lost from hydro stations.

52. It is valid to consider the potential alternative means of generating electricity should a unit of water be removed. Clearly, alternative means of generation will be required to meet growing electricity demand. However, in my view the approach should consider the long-run marginal cost (LRMC) of the *next best*

method of generation, reflecting the cost of an increment in generation capacity in the future. If less water is made available for hydro generation, then existing hydro generation capacity will produce less than otherwise and that capacity will need to be replaced by new generating capacity that would not otherwise be needed. The LRMC of an increment in generation will be lower than the Whirinaki peaking plant and higher than the historical average spot price (which included a period when New Zealand had surplus generating capacity and fuel costs were much lower than they currently).

53. By using an average of short-run historical prices, instead of the long-run marginal cost, introduces inaccuracies due to the implications of the changing seasonal value of water. For example, the spot price in times of drought can greatly exceed the Whirinaki trigger price of $0.16/m3. At other times of high rainfall the spot price would be very low and no issue would exist. Such values are not relevant for the purposes of making decisions on long-term water allocation.

54. Historical spot price data is not a good indicator of future prices and associated values for hydro-electricity water use due to the rising trend for the cost of new generation equipment, costs of consenting and land acquisition, and fuel costs over the past decade. Reflecting these cost changes, more recent data show a markedly higher average and median spot prices compared with the period used by NZIER.

55. The LRMC is a forward-looking estimate, which reflects the change in electricity generation capacity with regards to future demand pressures, impacts on the security of supply and pressures on the national grid, for example, across the Cook Strait. In particular, the economic impact of high electricity prices for a number of people or of electricity shortages are non-trivial and are not reflected in Dr Layton's methodology.

EQUITY

56. The RMA provides regional councils with the express authority to establish rules in a Regional Plan to allocate resources, and to manage the allocation between competing resources.[11] A regional council must evaluate the trade-offs inherent in its plan, according to the requirements in section 32.

57. Section 32 requires a local authority to examine:

(a) The extent to which each objective is the most appropriate way to achieve the purpose of the Act.

(b) Whether, having regard to their efficiency and effectiveness the policies, rules, or other methods are the most appropriate for achieving the objectives. [12]

58. Dr Layton refers to the Ministry of Economic Development Code of Good Regulatory Practice when evaluating Horizons' section 32 report. The principles in the MED Code can be summarised as efficiency, effectiveness, transparency, clarity and equity. As Dr Layton notes, the RMA does not require equity; nevertheless he considers it a pertinent criterion for the RMA and for his analysis.

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[11] Section 30(1)(fa) and Section 30(4)(e).
[12] Section 32(3)(a) and section 32(3)(b).

59. The Equity Guidelines referred to in the MED Code of Good Regulatory Practice include "*People in like situations should be treated in a similar manner, similarly, people in disparate positions may be treated differently*"[13].

60. Dr Layton states that the cost of compliance will likely differ among farmers under Rule 13-1 of the One Plan compared to the voluntary approach for other types of farming operations under Policies 5-1 and 5-2. Dr Layton appears to see this as a violation of horizontal equity.

61. It is not clear to me how equity as defined in the Code is violated here: *Prima facie*, Rules 13-1 and Policies 5-1 and 5-2 appear targeted at "people in disparate situations", and so it may be appropriate and consistent with the MED Code (to the extent it's a relevant criteria for RMA analysis) if these people, or rather, farming operations, face different compliance regimes and associated costs.

62. In any case, it is my understanding that section 32 of the RMA contains the directions that planning authorities are required to follow in assessing plan provisions. Guidance from other sources, such as the MED Code may be of some help in applying section 32, but I understand that they cannot add obligations to assessments carried out under the RMA that are not required by the Act.

CONCLUSION

63. I consider Dr Layton's comparison of water values in competing uses to be unsound. The NZIER study he bases his opinion on is fundamentally and logically flawed, firstly because it has several technical flaws and secondly because it does not consistently compare marginal values of water use. Lastly, the values from Canterbury are not applicable to Horizons due to differences in, for example, soil quality and rainfall that imply different values of water across different regions. The equity comments he makes have no basis in the RMA and appear unsupported by the Code of Good Regulatory Practice.

[13] Code of Good Regulatory Practice, Ministry of Economic Development sourced on 9 July 2009 from http://www.med.govt.nz/ templates/MultipageDocumentTOC____22149.aspx#P43_5264