

**TO CANTERBURY REGIONAL COUNCIL, WAIMATE DISTRICT
COUNCIL**

**IN THE MATTER OF RESOURCE CONSENTS: CRC160871,
CRC160872, CRC160873, CRC160874, CRC160875,
CRC160876, CRC160940, and RMA150031 related to the
expansion of Fonterra's milk processing plant at Studholme**

Submission by Coal Action Network Aotearoa

Testimony of Peter Fraser

Principal and Director

Rōpere Consulting Limited

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Biographical Details

1. My full name is Peter James Fraser. I hold a BA from Massey (double major in economics and history), a BCA from Victoria (Commerce), and an MCA from Victoria (Economic History). I operate as Rōpere Consulting and specialise in microeconomic policy analysis.
2. I have previously worked in policy and economics-related roles at *The Treasury* (1997-2007), *MAF Policy* (2007-2010), *the Department of Building and Housing* (2010-2011), *the Department of Labour* (2011-12), *the Earthquake Commission* (2013-date).
3. In terms of agri-business experience:
 - a. Between 2007 and 2010 I was a principle advisor in MAF Policy covering the dairy industry with particular emphasis on regulatory/competition issues and Fonterra capital structure issues.
 - b. Between 2010 and 2012 I provided extensive economic advice to three independent dairy companies regarding the legislative changes required to permit Fonterra's 'Trading Among Farmers' regime to proceed (and the competition policy implications thereof).
 - c. Since 2014 I have focused on irrigation and water storage issues, providing independent analysis of the Ruataniwha Water Storage Scheme, an initial analysis of the proposed Mangatarere Irrigation Dam (located in the Wairarapa), and was commissioned to provide expert advice to Tasman District Council regarding the proposed Waimea Irrigation Scheme.
 - d. My current work relates to a regional development project in the Northern Rangitikei for a Māori Trust Board. It involves determining the viability of establishing a beverage and food hub based in an abandoned heritage brewery.
 - e. I am frequently called upon to provide expert opinion by Radio New Zealand, Fairfax (both rural and mainstream media channels), APN, and Television New Zealand.
4. I have read, understood and agree to comply with the Code of Conduct for Expert Witnesses found in schedule 4 of *The Judicature Act* (1908).

Purpose

5. The purpose of this paper is to provide economic analysis relating to the on-farm environmental effects associated with the proposed expansion of the Studholme plant (located in Waimate, South Canterbury). An approach based on the identification of

economic *externalities*¹ is employed with environmental effects on freshwater quality used as an example of the type of economic externality Commissioners may wish to take account of when considering the Resource Consent application by Fonterra Cooperative Group Limited ('Fonterra').

Summary of Fonterra's Proposal

6. It is my understanding Fonterra is seeking a resource consent to enable it to build, at some point in the future, two additional spray driers on its existing Studholme site. Each drier will have the ability to produce up to 30 metric tonnes of whole milk powder (WMP) per hour (peak production) and it is stated each drier will process 4.5M litres of milk per day. The rationale given for expanding the Studholme site is to keep pace with increasing South Island milk production, which is forecast to grow at 4-5% per annum.
7. The major economic benefits cited² in support of the application are in terms of additional jobs created (both directly and indirectly, and during both the construction and operation phases), wages and salaries paid, and reduction in transport movements.
8. It is also stated:

*The proposed expansion of milk processing capacity at Fonterra's Studholme site will not give rise to economic externality costs.*³

Summary of key points made in this submission

9. It is noted neither a commercial nor a societal cost-benefit analysis (CBA) of the proposed project has been completed. From an economic perspective, this is a major omission as CBA is considered a robust methodology to determine the economic merits of a project (or otherwise).

¹ In microeconomics the concept of externalities is part of the field of *welfare economics* and is often associated with the literature covering *market failure*. In its simplest form, externalities are either positive or negative outcomes associated with a particular project that is un-priced so is not part of the market process. This means that some of the costs and benefits of a project are not considered - or 'internalised' - by the decision maker. For example, a beautiful garden in front of a house may bestow a *positive externality* to neighbours in terms of aesthetic values and potentially increased property values; whereas a coal fired power station may produce a negative externality in terms of air pollution and reduced property values. Standard theory posits that an unregulated market will under produce the 'goods' and over produce the 'bads'. This is because the respective costs or benefits are not captured by the decision maker, but are instead 'socialised'.

² Copeland, M, *Application for Resource Consent to Enable Expansion of Operations at Fonterra's Studholme Dairy Manufacturing Site: Assessment of Economic Benefits* Brown, Copeland and Co Limited, April 2015

³ *Ibid*, paragraph 7.3, page 20

10. The absence of a cost-benefit analysis notwithstanding, the claimed economic benefits in terms of jobs created, wages paid, and reduction in transport movements appear credible so are accepted.
11. The claim that the proposed site expansion will not lead to economic externality costs is *not* accepted; unless the scope of analysis is restricted to the confines of the factory boundary.⁴ Such an approach appears artificial and contrived, as the project is premised on processing additional milk ('new' milk) rather than redeploying existing milk ('old' milk) to a new plant (and decommissioning the existing factories as a result). Indeed, without substantial land use change in favour of dairy farming in the Southern Canterbury/Northern Otago region this project cannot proceed as there is no milk 'feedstock' to process (and as a consequence, the claimed economic benefits evaporate).
12. In short, it is argued that the decision making process for granting of a resource consent for the Studholme plant expansion cannot be made independently of the land use change the plant is premised on - as the two issues are inextricably linked and entwined in nature. In particular, from an economic perspective, it is contended the decision making process under the *Resource Management Act* (1991) needs to take account of the negative externalities associated with the land use change the plant expansion is premised on as the externalities associated with that land use change are regionally significant.
13. Negative externalities can come in numerous forms (e.g. air discharges, water discharges, loss of amenity value, etc.) and this paper does not attempt to outline every possible example (and neither does it attempt to monetise them). Instead, a single externality, being that of nitrate leaching into waterways, is used to illustrate the importance of taking externalities into account. However, if the Commissioners were of a mind to consider a negative externality such as additional on-farm N leaching then it follows that they may wish to consider other externalities such as pathogen loads in water, greenhouse gas emissions, and the net environmental impact of irrigation.
14. In order to quantify the on-farm effects in terms of N leach, a process of scenario planning is used; where processing capacity is then 'reverse engineered' back to the number of cows required to produce the stated volumes.
15. Based on the milk supply figure stated by Fonterra the Studholme expansion requires an additional **556,000 cows** (inc. replacements). Based on an environmental multiplier of 15, this is the equivalent of increasing the regional population by **8.3 million people**.

⁴ It is noted that by quoting efficiencies associated with transport costs, Mr Copeland has given consideration to effect beyond the 'factory gate' so has arguably already opened this line of analysis.

16. Consideration is also given to the implications of the current dairy downturn and whether the milk growth Fonterra expects to occur will eventuate; and if not, what are the implications for South Island processor capacity.

The value of a Cost Benefit Analysis

17. CBA is a measurement process where business decisions are analysed from either a commercial perspective (i.e. from the view point of a firm and/or investors) or a societal perspective (where factors such as additional economic activity or regional development opportunities can be considered). As its title suggests, the benefits of a given project or business-related action are monetised and summed and the costs associated with taking that action are subtracted.
18. Many projects have a long life, so costs and benefits typically accrue over time (and at different points in time - for example, costs may be 'front loaded' whereas benefit can be 'back loaded'). In order to compare costs and benefit over an inter-temporal time period a process of discounting is used to convert these benefit and cost flows into constant dollars in order to allow a valid comparison. Discounting also has the effect of introducing an element of risk analysis, as a more risky project would employ a higher discount rate to account for that risk. Indeed, both the public and private sector often set a 'hurdle rate' to ascertain whether a project is worth proceeding with at all.
19. From an economic perspective, and as an issue of public policy, a societal cost benefit analysis is the analytically correct method for assessing the economic merits of a project such as the Studholme expansion. It is therefore disappointing that no such analysis has been provided; and instead a list of benefits (e.g. additional jobs) and efficiencies (e.g. reduced transport costs) provided instead. Whilst I do not contest the figures provided by Mr Copeland (and note that given Fonterra is operating driers of a similar size to the proposed Studholme expansion that these figures are likely to be actual rather than hypothetical), a cost benefit analysis would have been highly desirable.

The issue of scope - should analysis be limited to factory-based effects only?

20. From an economic perspective a societal cost benefit analysis would take account of both the 'factory gate' and 'farm gate' environmental effects as a totality, as the two 'limbs' of the argument are inextricably intertwined so it makes no methodological sense to separate them. This is primarily because the plant expansion is premised on processing 'new milk' as a result of large scale land use change (with the corollary being without the land use change the plant has no milk to process and the claimed economic

benefits evaporate). From an economic perspective restricting analysis solely to consideration of 'plant' effects is arbitrary, artificial and unjustified.

21. For purposes of methodological clarity a comparison can be made if the expansion was premised on Fonterra rationalising existing plants and directing 'old milk' to a new plant - as that assumes an on-farm 'status quo' so does not involve any land use change. In this situation limiting consideration to 'factory effects' is justified.
22. I note that in his report, Mr Copeland has highlighted the efficiencies gained via reduced transportation movements. I therefore contend that the economic analysis has already 'jumped the factory gate' and if the on-farm effects outlined in this paper are deemed an irrelevant consideration then factors such as transport efficiencies should also be deemed an irrelevant consideration. Such an outcome defies notions of common sense, which suggests a consideration of effects outside the factory boundary is a fair and reasonable matter to consider.

Land use change - calculating the number of cows required

23. Successfully operating large scale spray driers tends to be a combination of a science and art, and it is accepted that Fonterra is highly competent on both counts. Moreover, capacity decision around drier capacity usage is dependent on a host of factors (i.e. market product demand, transport costs, inventory levels, etc.) so an economically rationale operator could well run a drier at a range of different capacity levels. However, there are two industry 'rules of thumb' worthy of note, namely:
 - a. An operator wants to have the drier operating at or near full capacity during the seasonal 'peak'; and
 - b. Across the season an operator wants the drier running at no less than 75% capacity.
24. Given the vagaries of powder production, there is no 'one right level of production', which makes a point estimate both futile and misleading. However, it is accepted that based on upon each drier processing 4.5 million litres of milk per day, the plant will be operating at, or close to, full capacity.

Scenario 1: Analysis and workings

25. Fonterra states that each of the proposed Studholme driers will have the capacity to produce 30 metric tonnes of powder per hour and will consume 4.5M litres of milk per day per drier. This provides the ability to 'reverse engineer' key aspects of plant

performance and then track back to cows numbers required to sustain that level of production.

26. Milk exhibits differences in concentration of milk solids across the season, though 11.5 is a reasonable conversion factor between litres and kilograms of milk solids (kgMS).

So: 4.5M litres per day divided by 11.5 = 391,304 kgMS per day

And: At the peak of the season a cow produces 23 litres of milk per day. Given daily consumption of 4.5M litres per drier, this implies a milking herd of 195,652 cows.

But: Cows are not eternal so need replacements. This implies a 195,652 cow milking herd requires 40,969 Rising 1 heifers and 40,133 Rising 2 heifers to maintain stable production. The result is a total herd size of 277,754 animals.

And: Stocking rates vary at between three to four cows per hectare. Based on three a total herd of 277,754 required 92,584HA of new dairy land; whereas a stocking rate of four implies 69,438HA of new dairy land (NB: a stocking rate of four implies a high intensity farm that is likely to be irrigated. It is acknowledged it is unlikely there will be the area required for irrigated dairy at this scale).

But: An increase in dairying implies land use change - most likely out of dry stock farming to intensive dairy or irrigated intensive dairy. As a planning figure, dry stock farms are likely to leach 15 kgs nitrate per HA per annum. However, intensive dairy is unlikely to be less than 30 kgs nitrate per HA per annum and irrigated dairy unlikely to be less than 45 kgs nitrate per HA per annum. The result is a marginal increase in N leaching of 15 kg per HA per annum and 30 kg HA per annum respectively.

So: Applying the low leaching rate with the lower stocking rate implies an increase in N leached of 1,388 tonnes per annum ($92,584\text{HA} \times 15\text{kg} = 1,388$ tonnes); whereas using the higher stocking rate with the higher leaching rate implies an increase in N leached of 2,083 tonnes per annum.

Finally: Cows have a broadly equivalent water footprint to between 14 and 21 people. Applying a multiplier of 15, each drier is equivalent to increasing Waimate's population by 4.166M people - so given the proposal is to build two driers that equates to 8.33M people.

Reality check - is Fonterra's assumption of ongoing growth in South island milk supply justified

27. The dairy industry is currently experiencing an extended period of low prices, with the question being whether these prices are cyclical or structural in nature. Whilst there is a semantic aspect to this question, it is increasingly clear that there has been a change in the dynamics within international dairy markets that means the milk price level between 2007 and 2014 (\$6.60 +/- \$1.80) is unlikely to be a good guide to the future. It is my professional opinion that the 'new normal' in milk price may well be a range of \$5.00 +/- \$1.00 (c/f. the period 1998-2006 saw a milk price of \$4.40 +/- \$0.90).
28. The simple point is that at an expected milk price of \$5.00 +/- \$1.00 the recent expansion in the dairy industry in the South Island is no longer economic - so future conversions are also unlikely to be economic. Moreover, from an economic perspective irrigated dairy is completely uneconomic - with even optimistic analysis suggesting the need for a milk price of at least \$6.50 to achieve a 'break even' result - so building plants on the assumption of newly irrigated area will be producing milk is increasingly doubtful.
29. The implications of a structurally lower milk price goes beyond farmers failing to expand (so milk growth tends to zero) - there is also the implication of farmers destocking and reducing production in order to reduce cost structures (so South Island milk supply declines). In such a situation Fonterra risks being left with a 'stranded asset' problem in that it has excess processing capacity - which is a problem that currently besets the meat processing sector. Consenting yet additional capacity is therefore commercially risky and economically inefficient from an allocative efficiency perspective.

References

Copeland, M, Application for Resource Consent to Enable Expansion of Operations at Fonterra's Studholme Dairy Manufacturing Site: Assessment of Economic Benefits Brown, Copeland and Co Limited, April 2015

Fonterra, Media Release: World's largest drier kicks into gear at Darfield, 2 September 2013

Located at: <https://www.fonterra.com/wps/wcm/connect/6f493887-e7f8-4339-9992-496e23b5a23d/WORLD%E2%80%99S+LARGEST+DRIER+KICKS+INTO+GEAR+AT+DARFIELD.pdf?MOD=AJPERES>

