Walcha Council Efficiency Report

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Executive Summary

This report provides a comprehensive review of the relative technical efficiency at Walcha and also makes some important recommendations for how to improve matters. Overall, Walcha Council has relatively low technical efficiency and this has been a feature of its operations for at least the last decade. Our investigations suggest that relative inefficiency arises due to two major influences: (i) a sub-optimal use of production factors (staff and money), and (ii) a particularly challenging operating environment. We make several recommendations that are expected to largely redress extant sub-optimal production processes. However, the problems regarding operating environment largely centre on the small population of the local government area combined with extensive road infrastructure burden. These latter factors lie largely outside of the control of Council and underline the importance of a fair and competent system of intergovernmental grants.

1. Introduction

Local government efficiency is a major concern for the Independent Pricing and Regulatory Authority (IPART) when assessing special rate variations. Moreover, 'efficiency' played an important role during *Fit for the Future* (the recent reform program most notable for its emphasis on forced amalgamation) and is clearly a matter of concern to the Office of Local Government.

However, efficiency remains ill-defined in a public policy sense. Economists typically refer to three distinct kinds of efficiency that all have different implications for local government practice. It is thus important to briefly describe these various notions on efficiency in order to clarify what it is exactly that the regulator wishes to assess.

Allocative efficiency refers to how resources are harnessed to maximise the well-being of citizens (Fergusson, 1972). To achieve optimal efficiency of this kind requires that decision-makers employ an ideal mix of inputs to produce the quality and quantity of local government goods and services desired by the community. In a local government sense, the main mechanism for achieving allocative efficiency is democracy, and the principal players in the process are the Councillors.

Technical efficiency (also sometimes referred to as productive efficiency or x-efficiency) requires local governments to achieve an optimal conversion of inputs (staff and capital) with respect to a range of local government outputs (Drew, 2021). This concept is aligned with the idea of value-for-money and appears to be the principal concern of regulators. Thus, during *Fit for the Future* attempts were made to assess local government efficiency according to operating expenditure per person (although this was clearly a flawed metric as we will later show). The hope seems to be that improvements to technical efficiency might result in enhanced financial sustainability.

We draw this inference, regarding the likely motivation of regulators, from the fact that efficiency was a major point of rhetoric alongside financial sustainability during the recent reform program.

However, in point of fact, there is only a tenuous and relatively small association between these two disparate economic concepts (technical efficiency and financial sustainability respectively). Indeed, peer-reviewed empirical work has demonstrated this to be the case (see Drew, Kortt and Dollery, 2015a). The reason for this weak association is because financial sustainability has a long-run outlook, whereas efficiency is a short-run economic concept. Otherwise stated, the financial sustainability predicament of a local government is likely to have been built up over many decades, and it is therefore unreasonable to expect current improvements to technical efficiency to have an immediate and material mitigatory effect.

Moreover, it is by no means certain that efficiency is a legitimate goal of government (Drew, Razin and Andrews, 2018). Indeed, recent comprehensive work conducted by Bozeman (2019) found no evidence to support the notion that citizens perceived 'efficiency' to be something intrinsically valuable. Instead, citizens appear to prioritise concern for values such as safety and security, civil rights, access to services, and privacy. These recent scholarly findings tally with the large corpus of scholarly literature which has generally concluded that technical efficiency is a goal incongruous to government and better achieved through price signals and free-market activity (Drew, 2020).

In a local government sense, the main means of improving technical efficiency is to ensure that the correct quantities of the two inputs (staff and money) are combined in an optimal ratio. The principal players in this endeavour are the General Manager and Directors of the local government, although operating environment can also exert determinative effects.

Dynamic efficiency is the third relevant economic concept and refers to the improvement of both allocative and productive efficiency over time (Drew, 2021). It is principally driven by improvements to technology and learning. Dynamic efficiency might also be enhanced as a result of helpful policy and legislative change. In a local government sense dynamic efficiency largely arises because of the actions of others (although Councillor and management contributions to allocative and technical efficiency respectively still remain relevant). Scholars generally consider that the principal players in this endeavour[1] are private industry (which develop new technologies and machineries), universities (which provide important education and research inputs), regulators (who set rate caps and benchmarks which affect performance over time) and higher-tier politicians (mainly through legislative changes).

Thus, it appears that the emphasis of IPART and regulators seems to be directed towards technical efficiency. However, measuring efficiency is no simple matter – crude ratios frequently employed by local governments and regulators have a high likelihood of seriously misleading end users and resulting in poor decision-making.

[1] Notably these actors may exert either positive or negative effects on dynamic efficiency.

Therefore, in this report we invoke sophisticated world's best practice (data envelopment analysis followed by second-stage panel regression), to ensure that the community of Walcha is provided with robust and reliable information as a strong foundation for understanding the implications of extant efficiency with respect to a special rate variation.

This report is comprised of four additional parts. In the next section we review standard ratios in use by regulatory agencies to try to estimate efficiency with reference to a fourteen-member peer group. Following this, we conduct a data envelopment analysis of tax efficiency, with reference to the larger fifty-eight member cohort of rural councils, in order to cast light on the matter which seems to be most important to IPART. Thereafter, we present the results of a second data envelopment analysis (also made with reference to fifty-seven peers). This supplementary data envelopment analysis is specified in a manner consistent with standard relative technical efficiency studies in the literature to try to understand how Walcha Council has performed over the last decade or so. In Section 5 we explore the determinants of technical efficiency with the objective of identifying how much of the efficiency outcomes at Walcha Council can be attributed to the decisions made by management. We conclude this report with some recommendations regarding measures that might be taken to improve technical efficiency in the future.

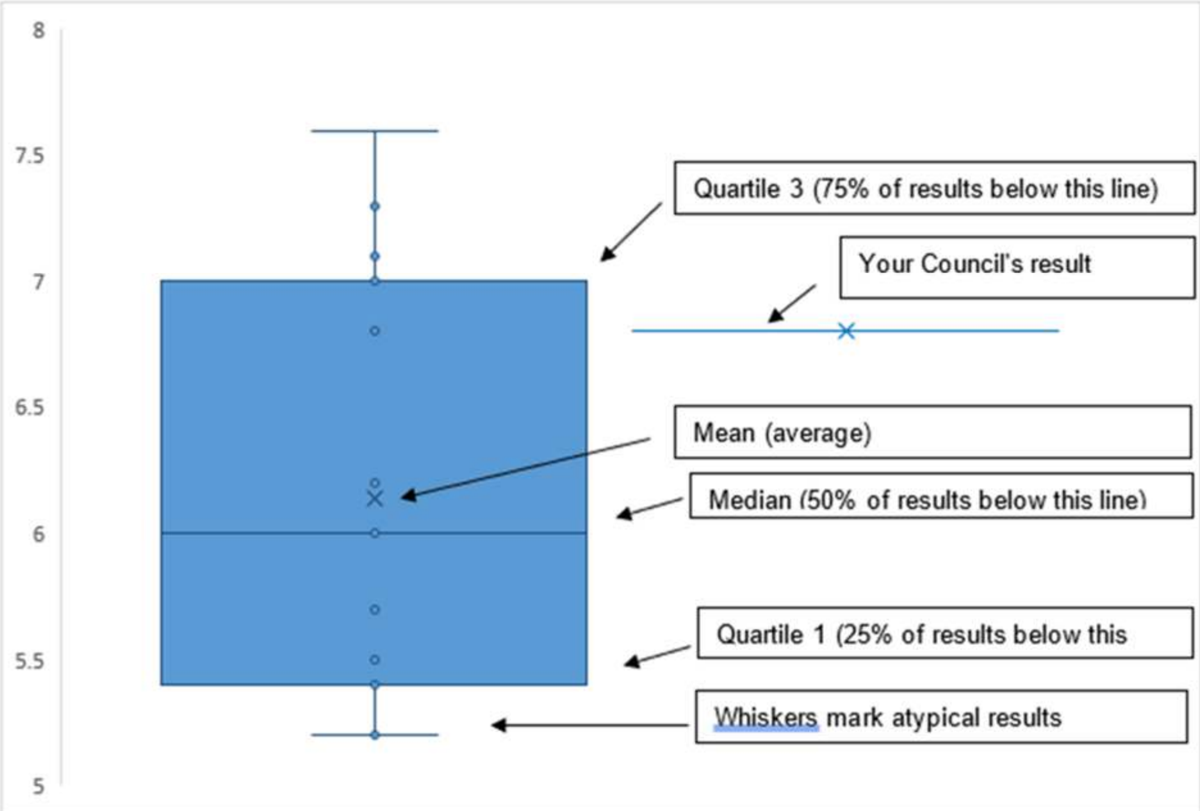
2. Ratio Analysis of Efficiency

The starting point for our efficiency analysis is to review two ratios commonly employed in the sector to try to understand technical efficiency. For the work that follows in this section, Walcha Council is compared to the peer group specified in Table 1 and will be illustrated in box and whisker plots (see Figure 1 for interpretation).

Table 1. Peers Used in Comparisons

OLG	OLG	OLG
Bogan	Murrumbidgee	Tenterfield
Bourke	Weddin	Uralla
Coonamble	Dungog	Walgett
Gilgandra	Gwydir	Warrumbungle
Hay	Liverpool Plains	

Figure 1. Interpreting Box and Whisker Plots



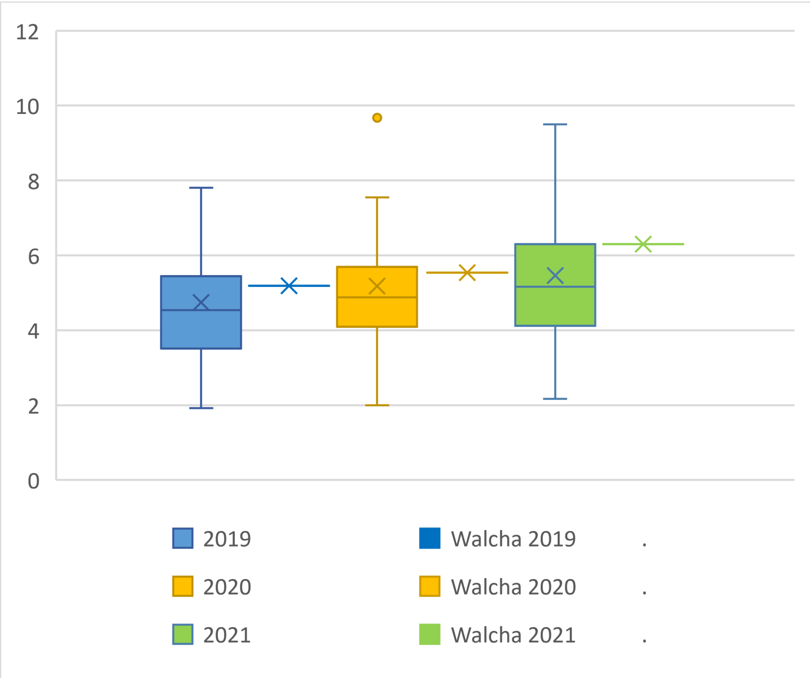
The ratio mandated for efficiency estimation in New South Wales is the operational expenditure per capita metric as illustrated in Figure 2. This metric was extremely controversial during the *Fit for the Future* reforms, with scholars noting that it simply 'does not measure efficiency' (Drew and Dollery, 2015, p. 86).

According to Figure 2 Walcha has relatively poor achievement in this area, which has been deteriorating further in recent years (please note that for this ratio higher outcomes are undesirable). Indeed, the ratio suggests that Walcha Council consistently performed well inside of the lowest fifty percent of the peer group. However, it would be unwise to place too much emphasis on the result because the metric is beset with a number of serious flaws.

First, the Operational Expenditure per Capita metric employs unreliable data as a key input – the ABS clearly discloses that population data is merely an estimate in intercensal years. Indeed, studies have demonstrated that the error for population data can be as high as 15.6 percent and that large errors are particularly likely in small local government areas (Drew and Dollery, 2014). Second, it is unreasonable to use a metric wherein the denominator implies that most services provided by local government are directed towards people, rather than properties. Whilst matters are slowly evolving the preponderance of service delivery in Australian local government is still directed towards things such as rubbish collection, water supply, and sewerage disposal that are better correlated to the number of premises[2]. Third, the metric implies that the cost to 'service' people making up the various categories of ratepayers are equivalent. Otherwise stated, an operational expenditure per capita metric implicitly asserts that it is reasonable to assume that the cost of delivering services for business and farms is somehow comparable to the expense associated with residential properties. Given the vast differences in service provision associated with the various categories this assumption is clearly invalid. Fourth, the operational expenditure per capita metric completely ignores the single largest item of expenditure for New South Wales local government – roads (which typically account for around a quarter of operating costs; Drew and Dollery, 2015). This is particularly problematic because road length across the state is negatively correlated to population size (r= -0.2531) – that is, as population increases road length decreases, thus confounding any hope of comparability.

For all these reasons it would seem unwise to pay much regard to the outcome illustrate in Figure 2.

Figure 2. Operational Expenditure per Capita ($'000)



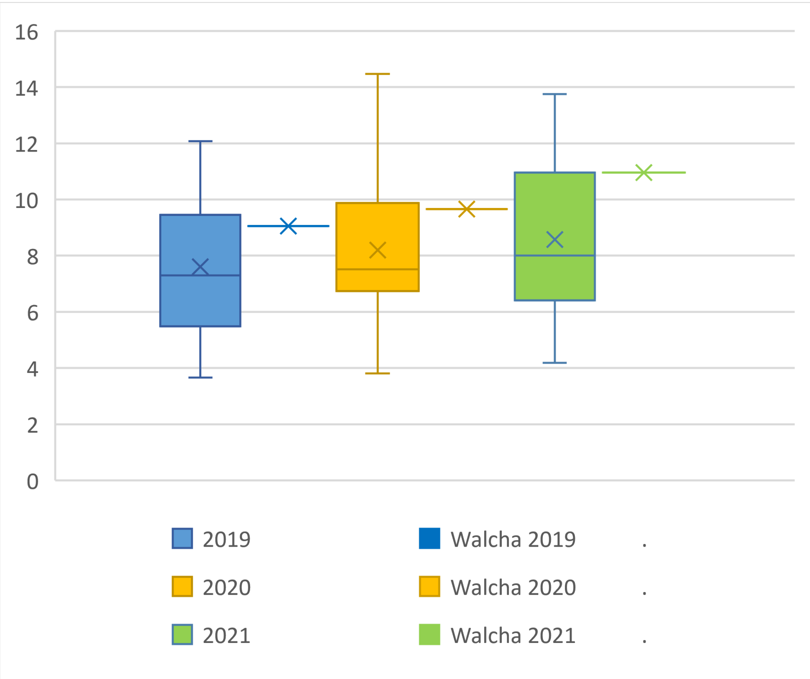
In Figure 3 we illustrate relative performance against the fourteen-member peer group for a better (but still sub-optimal) metric – operational expenditure per assessment, as used throughout Victoria. The biggest point in favour for this metric is the use of assessment data, rather than population estimates. Assessment data is less likely to impute significant errors which will distort matters and is also better associated with

[2] To defend the use of population one would need to be able to convincingly argue that the cost of supplying services such as these is highly correlated to the number of people living in a property. For example, one would need to be able to show that the cost of picking up domestic rubbish at a house with five residents is close to five times higher than the cost to service a sole occupant dwelling.

the service delivery channels actually employed by local government. Notably, the undesirable position of Walcha has not changed appreciably under this alternative ratio, in relative terms, and it also suggests that matters have deteriorated in recent years.

However, it would be unwise to place too much emphasis on an operational expenditure per property assessment metric because it also neglects the single largest cost to local government – roads. In addition, the ratio also operates according to an erroneous assumption of equivalence in service provision with respect to the various categories of local government taxpayers. As a result, whilst the metric is certainly an improvement with respect to the NSW mandated ratio, it is far from reliable and thus shouldn't be used for important decision-making purposes.

Figure 3. Operational Expenditure per Property Assessment ($'000)



The main problem with using the aforementioned crude ratio analyses to assess efficiency is that methods of this kind only allow a limited number of variables to be employed. This means that ratios are often deficient from an information value perspective, and also tend to impute the kind of implausible assumptions that we discussed earlier.

The solution to the well-known limitations of ratio analyses is to employ data envelopment analysis in its stead. Data envelopment analysis is a sophisticated empirical technique that makes use of computationally intensive linear programming[3]

[3] Linear programming is a mathematical technique that can be employed when multiple feasible solutions exist in a mapped function responsive to introduced mathematical constraints. It is iterative in nature and thus requires significant levels of computational power.

to accommodate *multiple* inputs and *multiple* outputs, limited only by Nunamaker's[4] rule. Moreover, by using an input-orientation for the model we can determine quite precisely the minimum number of inputs that would be needed to optimally produce the given number of outputs.

The best way to conceptually understand data envelopment analysis (DEA) is through recourse to an illustration. Accordingly, in Figure 4 we have graphed a simplified input-orientated DEA. In this example we see that an efficient frontier has been formed by Councils C, B and D. These councils have been determined by the mathematical algorithm to have most optimally converted inputs into outputs. By way of contrast, Council A lies in the interior of the frontier because it is less than optimal in its conversion of staff and money into the various outputs of local government. Moreover, the relative technical efficiency of Council A can be quantified precisely by calculating the ratio of the radial distance as indicated by the dotted line. Notably, the efficiency score thus produced for Council A is referred to as *relative* technical efficiency, because it's value is only meaningful when understood in context of the frontier (and hence the other councils included in the linear programming exercise).

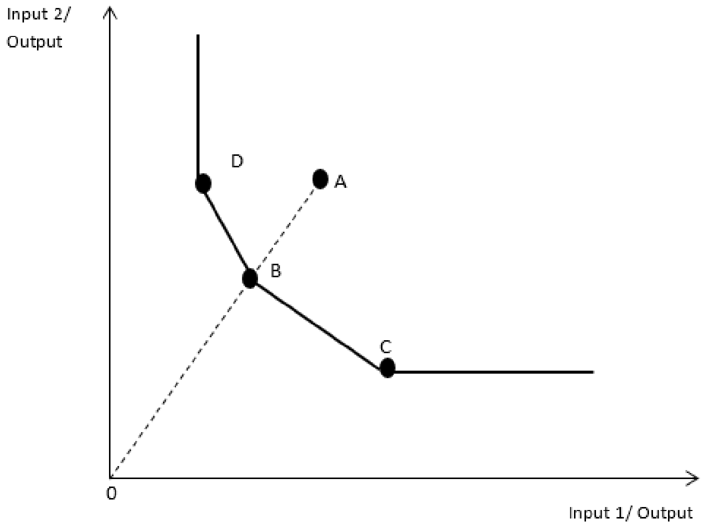
In practice, DEA scores are usually censored at both the lower limit (0; perfectly inefficient) and the upper bound (1 which is understood to be perfectly efficient in a relative sense). However, even more sophisticated modelling – referred to a super-efficiency DEA – can further differentiate between councils and thus provide greater discriminatory power. Super-efficiency is allowed to occur when an additional mathematical constraint is introduced to the algorithm which prevents a local government from being compared to itself on the frontier. The result is that some particularly outstanding councils are assigned scores greater than one.

The other major point to note with respect to data envelopment analysis – especially when conducted with bootstrapping[5] for additional assurance – is that scores of individual local governments can tend to cluster around particular values. This potential for clustering is mostly an artefact of local governments being obliged to work with very high levels of technical efficiency in response to similarly challenging operational environments and is most noticeable in the DEA of rural local governments.

[4] Nunamaker's rule is a decision-making tool which prescribes that the sum of inputs and outputs should not exceed a third of the number of decision-making units (in this case local governments) used for the analysis. Thus, for our fifty-eight member cohort, the upper-limit sum of inputs and outputs would be nineteen variables.

[5] Bootstrapping is a probabilistic random re-sampling protocol that is used to reduce potential statistical bias when dealing with a sample.

Figure 4. Input-Orientated Data Envelopment Analysis



In the section that follows we will outline the specification and results of our first (of two) data envelopment analyses – which quantifies tax efficiency with respect to the fifty-eight member rural local government cohort over the last four financial years.

3. Tax Efficiency 2018-2021

As we noted earlier there appears to be some interest amongst regulators in assessing the value for money proposition. Accordingly, in this section we evaluate local government taxation efficiency with the intent of quantifying the relative success of Council in converting rates money into various local government outputs. To do so we take a single input (total local government tax take) and assess its conversion into five output proxies[6] (number of residential, business and farm assessments, as well as the length of sealed and unsealed road respectively). By using just a single input to the data envelopment analysis we can focus on the value for money associated with the local government tax dollar – however, it also means that we don't explicitly assess the effect of how money and staff are mixed as part of the production process (this particular aspect will feature in our second DEA).

Moreover, the use of five disaggregate outputs allows us to comprehensively redress the failings of the crude ratio approaches surveyed earlier. Otherwise stated, we explicitly control for the different goods and services associated with each rating category as well as account for the single largest item of expenditure (roads). Indeed, with respect to the latter we also nuanced matters in important ways by capturing the different costs associated with sealed and unsealed roads respectively.

Thus, our data envelopment analysis can be specified as follows:

[6] This DEA – like most economic work – makes use of proxies. A proxy is a piece of data that is known to have good correspondence with a number of other pieces of data. Because all economic analysis has some limitations on the number of data inputs, proxies are a common and largely unavoidable practice.

Total taxation take ($'000) → residential (no.) + farm (no.) + business (no.) + sealed roads (km) + unsealed roads (km).

Because we are only dealing with a relatively short period of time, we elected to conduct the DEA as a global intertemporal analysis. The principal assumption for global intertemporal analysis is that technology and policy have been relatively stable over the period under investigation. Furthermore, constraints were introduced to the modelling so that efficiency scores yielded would be variable returns to scale (VRS) in nature. Otherwise stated, the scores that follow are adjusted for the relative size of the different rural local government so that like-for-like comparisons become valid.

It is important to note that data envelopment analysis is unconditional. This means that the efficiency scores yielded have not been adjusted for the operating environments of particular local governments. Nevertheless, it is essential to understand how non-management factors have influenced efficiency and accordingly in Section 5 we conduct an important econometric investigation of efficiency determinants.

To make this work particularly robust we used order-alpha DEA (with alpha set at 0.9), to correct any potential bias associated with outliers. Outliers are particularly unusual data points (either relatively high or low with respect to the cohort), that might otherwise skew efficiency scores. To complement this cutting-edge mathematics, we also conducted bootstrapping with 2,000 replications.

In Figure 5 we plot various line graphs for tax efficiency pertaining to the fifty-eight rural councils (according to the Australian federal classification system). The dark blue line represents the highest efficiency achieved for each of the years and provides a salient example of why it is important to introduce mathematical constraints to allow for super-efficiency. The light blue line is Quartile 3 (the top twenty-five percent of local governments lie above this point – that is, almost a quarter of rural NSW local governments are super-efficient). The lines for the mean, median and quartile 1 tend to overlap one another for most of the four years at a point proximate to perfect efficiency. This is a typical result for rural local governments which survive despite very adverse conditions because they are extremely proficient at converting scarce tax dollars into core local government goods and services[7].

The green line represents the relative technical tax efficiency of Walcha Council over the last four years. Notably the results are relatively poor (well within the bottom quartile (lowest twenty-five percent of performances), but stable. This result sits in some contrast to the story suggested by the crude ratio analysis of the smaller fourteen-member peer group that we surveyed earlier and thus underlines the importance of conducting robust DEA.

The reason for the different results rests largely on the better discrimination facilitated by (i) the disaggregation of assessment data, and (ii) the inclusion of disaggregated road data. It is pretty clear from the result tendered that the relative efficiency score has been affected by (i) the low ratio of residential assessments with respect to farms,

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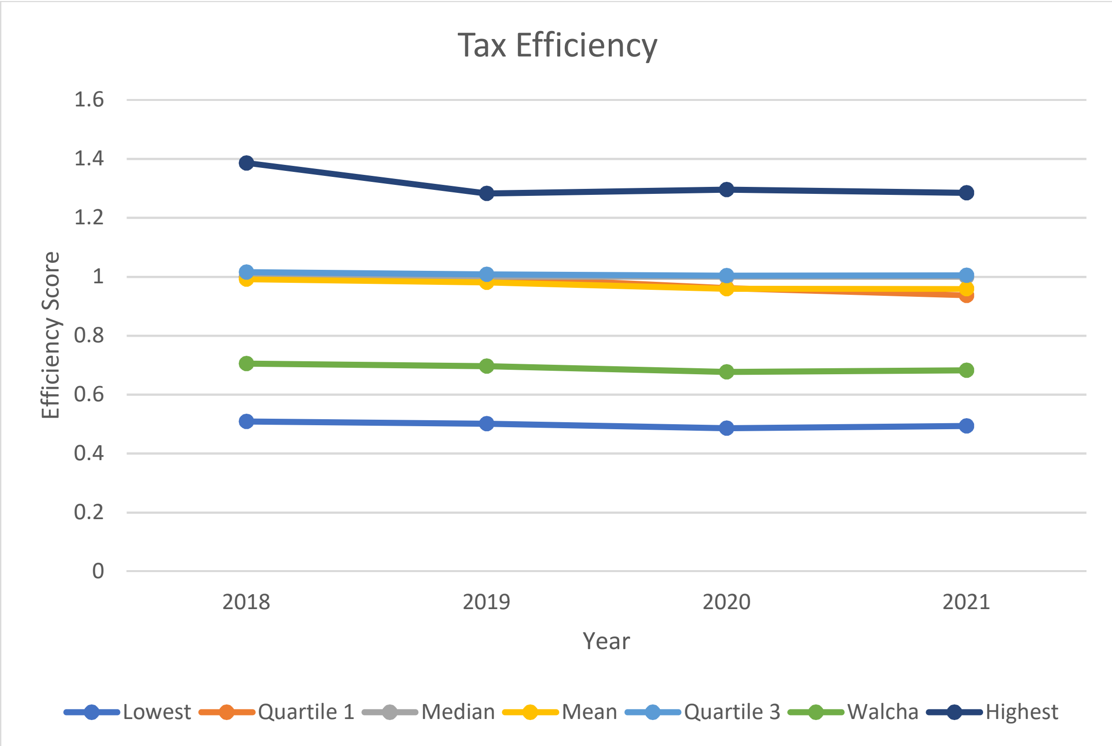
[7] There is much more discrimination in urban local government efficiency where far higher revenue capacity allows for much more discretionary spending and hence much lower relative technical efficiency (when compared to generally struggling rural councils).

and (ii) a lengthy and heavily trucked road network. We will test these logic deductions in our econometric investigation which is a feature of Section 5.

Figure 5. Taxation Efficiency Walcha and Peers – Global Intertemporal 2018-2021



In sum, the tax efficiency of Walcha Council is undoubtedly poor in a relative sense when compared to the cohort of rural councils that have largely performed at very high levels of efficiency. It appears that operating environment may have played some part in the result, however, in the absence of further econometric investigations these deductions cannot yet be confirmed.

4. Standard Relative Technical Efficiency

Standard technical efficiency examines how key inputs (staff and money) are combined to produce the various outputs of local government. It is important to note that economists widely believe that different ratios of these key inputs (referred to by scholars as 'factors of production') can result in varying levels of technical efficiency. Thus, this second data envelopment analysis is important in order to understand how management decisions regarding the mix of production factors have affected technical efficiency.

Data for the DEA inputs were obtained directly from the audited financial statements of the fifty-eight local governments. Notably, staff inputs have been expressed in dollars consonant with the corpus of scholarly literature because this approach better allows us to discriminate according to experience and productive capacity (Drew, Kortt, and Dollery, 2015b). The outputs for this DEA remain unchanged and hence the specification for the data envelopment analysis can be expressed as follows:

Staff ($) + operating expenditure ($'000) → residential (no.) + farm (no.) + business (no.) + sealed roads (km) + unsealed roads (km).

For this standard data envelopment analysis, we elected to draw on a far longer panel of data to test a claim in the community that efficiency has only recently deteriorated. Accordingly, we assembled nine years of data. This longer data panel necessitated the use of the local intertemporal method, employing two-year windows, because it was no longer reasonable to hold to the global assumption of stable technology and policy over such a lengthy period. Local intertemporal analysis is a special kind of sequential analysis which is much more computationally demanding but allows end-users to make robust comparisons between years.

A variable returns to scale constraint was employed again to mitigate the potential effect of size. We also used the order-alpha technique with bootstrapping to deal with potential outliers for additional assurance. We note again that data envelopment analysis is unconditional – that is, the efficiency scores yielded do not take account of the operating environment[8].

In Figure 6 we plot the result for Walcha Council as well as various measures of central tendency for the fifty-seven peers under analysis. Once again, it is notable that over a quarter of the rural councils operate with super-efficiency – a fact that is at odds with some urban myths regarding local government. In addition, we again see a clustering of results at or near perfect efficiency (1.0) which is typical for resource scarce rural local governments.

Walcha's efficiency score is marked by the green line, which readers will note is at or quite close to the lowest result for each and every year under analysis. This confirms that low relative technical efficiency is not a recent occurrence – it is something that has been a feature of Walcha for at least a decade (and most probably longer). As we noted in the last section it is important to remember that DEA is unconditional and thus that the scores may be influenced by a challenging operating environment (see the next section for an econometric exploration of this matter).

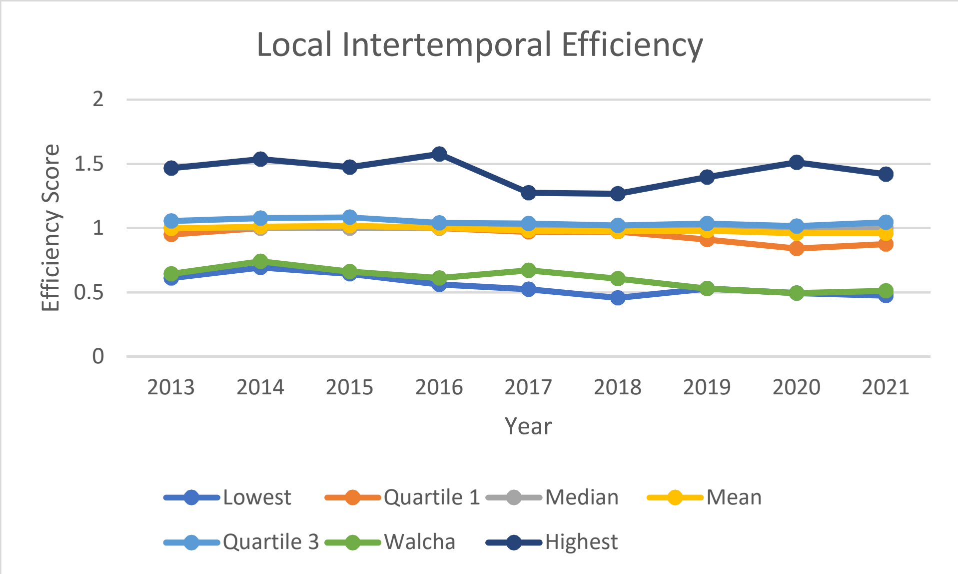
It will be noted that the absolute score, as well as relative position, for this standard DEA is even lower than it was for the tax efficiency study that we made earlier. This is due to two main reasons. First, the tax efficiency scores for Walcha were significantly boosted by relatively low tax take in the local government area. Second, the standard DEA specifically examined the efficiency effect of different ratios of production factors (staff and money). As we will see shortly, it seems that current practice deviates from the more optimal mixes employed by peer local governments.

We also note that this present result diverges even more from the outcomes suggested by the crude ratio analyses that we surveyed in Section 2. As we noted earlier the

[8] The efficiency scores merely measure the effectiveness of the conversion of inputs into outputs. They are adjusted to negate the effects of size, but are not adjusted to reflect the effects of operating environment. Thus, to understand the causes of a local government's technical efficiency it is also necessary to conduct a second-stage regression (see Section 5). Otherwise stated, the DEA tells us how effective a local government is at converting inputs into outputs, but it is the second-stage regression (and other supplementary analyses) that tell us the reasons why.

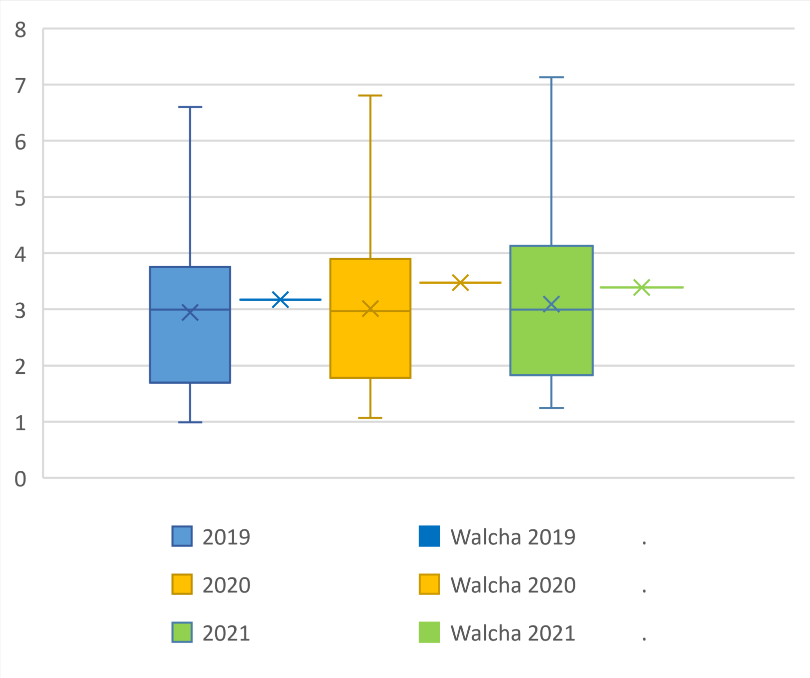
biggest cause of this divergence is the better recognition of the different goods and services produced for the various categories, as well as the inclusion of disaggregated road data. These factors, when combined with an apparently challenging operating environment – and also a sub-optimal mix of production factors – explain most of the observed efficiency outcomes.

Figure 6. Relative Technical Efficiency, Local Intertemporal, 2013-2021



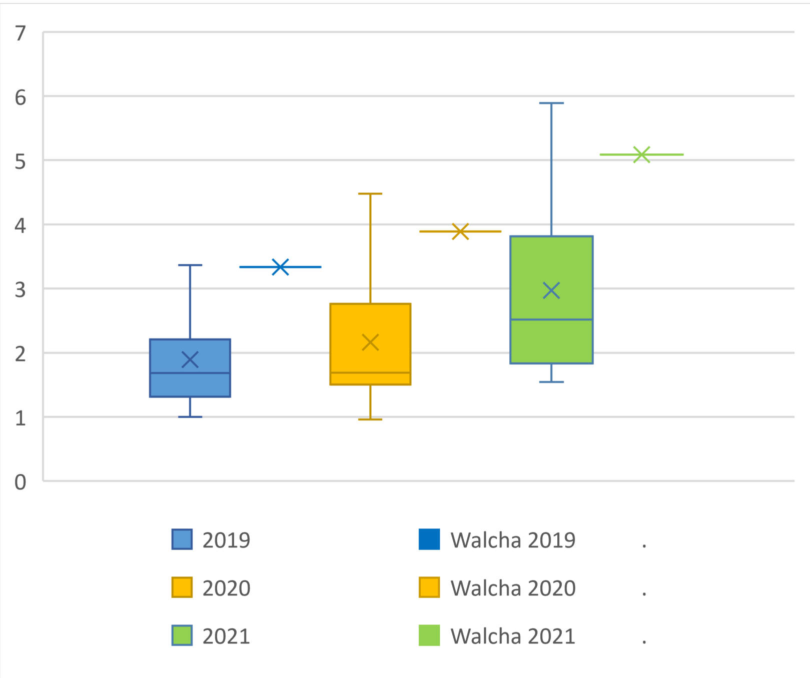
Before proceeding to the critically important investigation of efficiency determinants it is necessary to first spend a little time to investigate how the mix of production factors may have affected efficiency outcomes. In Figure 7 we illustrate the staff expenditure for Walcha relative to the fourteen-member peer group. As we noted in our Financial Sustainability Report the outcome for Walcha is quite pleasing. This is especially the case because comparatively small local governments like Walcha are disadvantaged in a relative sense by high average staff costs arising from a more-or-less fixed need for senior management (irrespective of size). Thus, it is unlikely that staff inputs can adequately explain the relatively poor technical efficiency performance at Council.

Figure 7. Staff Expenditure per Assessment



In Figure 8 we compare the materials expenditure per assessment for Walcha and the fourteen-member peer group. This additional data makes it quite clear that Walcha Council has been investing disproportionately high funds into the production mix. To understand precisely where the problem might lie, we also conducted a thorough examination of the notes to the audited financial statements for both Walcha and its comparable peers.

Figure 8. Materials Expenditure per Assessment



Our investigations suggest that the single greatest point of departure, with respect to the peer group, is in the area of contract expenses. Indeed, Council appears to have been consistently spending around twice what might be expected of a local government of its size. Senior management have advised that much of this expenditure is associated with equipment hire. As we outlined in the Debt Report there is scope to mitigate this problem through the judicious use of productive debt. Therefore, things should be expected to improve in the near future.

A much smaller disparity exists in relation to relatively elevated staff training costs. Management have advised that these costs have been elevated for the last few financial years as a result of a need to mitigate skill deficiencies that arose over preceding years. Skills gaps have now been addressed and therefore training costs will decrease significantly in future years.

Our comparative analysis also makes clear that Walcha incurs Councillor and Mayoral costs that are typically fifty thousand or more larger than might be expected for a local government of the council's size. Notably, these additional costs are not due to profligacy or waste, but rather a disproportionately high number of representatives per citizen. Indeed, as Figure 9 illustrates representation ratios at Walcha are in the bottom quartile when considered on a state-wide basis (thus suggesting that Walcha has relatively more Councillors for its population than might be found for over three-quarters of the state's local governments).

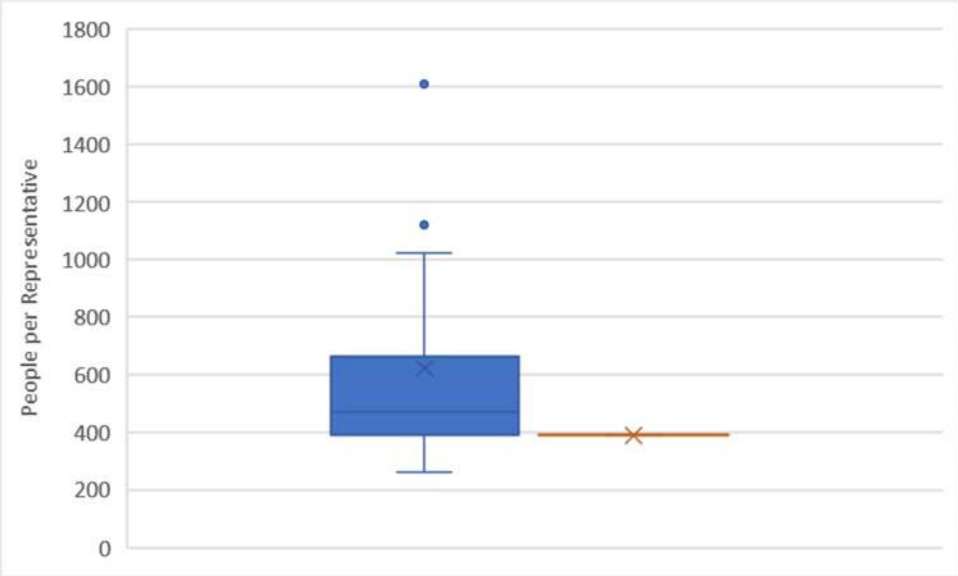
Further, we note from the surveys made of Walcha residents proximate to *Fit for the Future* that 66 percent of residents were in favour of reducing the number of Councillors at that time. This perception seems to be consistent with NSW Electoral Commission data that shows that four of the current eight Councillors were elected unopposed in 2021 (NSW Electoral Commission, 2022).

Section 224(1) of the Local Government Act (1993) stipulates that the minimum number of Councillors that must be elected is five (5). If Walcha Council were to reduce its cohort of Councillors down to just five, then the representation ratio would reduce accordingly to approximately 621 people per Councillor (from its current level of 388). A representation ratio of this size would be consistent with the fourteen-member peer group average of 624, although still well-below the state-wide average of 4,411 people per Councillor.

It is noted that the ward structure that existed previously had some effect on Councillor numbers. We are pleased to see that wards have been abandoned (especially given the higher operating costs associated with political fragmentation) and note that this now paves the way for a reduction to Councillor numbers.

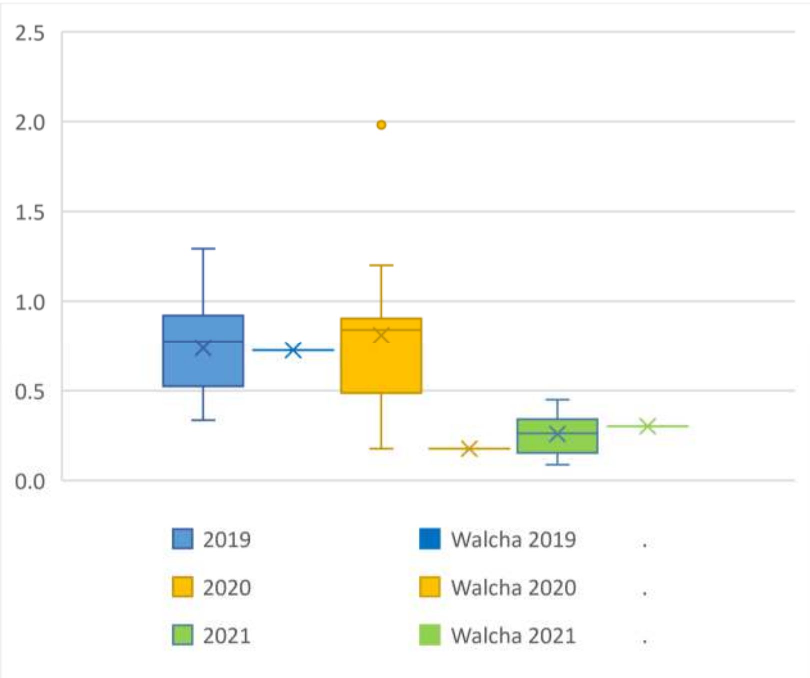
Section 224A of the Local Government Act (1993) outlines the process to reduce the number of Councillors – essentially a resolution of Council, call for public submissions, and a written application to the Minister.

Figure 9. People Per Representative



For the sake of completeness, we also made comparisons of the ‘other expenditure’ accounting category from the audited financial statements. This is a relatively minor category of expenditure that tends to be rather volatile. Figure 10 illustrates this point and also suggests that Walcha’s performance in the area is pretty consistent with expectations.

Figure 10. Other Expenditure per Assessment



In sum, Walcha’s relative technical efficiency is rather poor and has been so for at least a decade, if not more. It appears that the mix of production factors is part of the explanation for this performance and in our comparative work we have shown where savings can be made. However, it is clear that disproportionate operational expenditure alone cannot fully explain the relatively poor showing. Readers will recall that operating environment is also an important determinant to technical efficiency. To understand both the nature and effect of Walcha's operating environment we needed to also conduct some sophisticated econometric modelling – the results of this work will be presented forthwith.

5. The Determinants of Efficiency

In this Section we seek to quantify the effect of operating environment on relative technical efficiency. To do so we conducted regression analysis which is a sophisticated mathematical technique capable of discerning the mean response of a dependent variable (the regressand), to a number of independent variables (the regressors).

The regressand for this exercise was the constant returns to scale (CRS) version of the standard technical efficiency data envelopment analysis specified as:

Staff ($) + operating expenditure ($) → residential (no.) + farm (no.) + business (no.) + sealed roads (km) + unsealed roads (km).

CRS needed to be used so that we could assess the effect of size on relative technical efficiency (readers will recall that VRS used in Section 4 already accounted for size and would thus confound the econometrics). Against these CRS scores we regressed a number of variables known from the corpus of scholarly literature to affect technical efficiency. These variables are detailed in Table 2, and we note that logarithmic transformations were conducted when indicated by diagnostic tests.

An OLS[9] regression was used, with the addition of year dummies to control for the four periods of time under analysis. In addition, we included a dummy variable to indicate whether or not a local government had been amalgamated in response to the substantial evidence that amalgamation has significantly decreased technical efficiency amongst merged councils (see, for example McQuestin, Miyazaki and Drew, 2020; Drew, McQuestin, and Dollery, 2021).

The econometric analysis that follows can be specified as:

$\mathbf{T} = \alpha + \beta 1\mathbf{P} + \beta 2\mathbf{X} + \boldsymbol{\mu}$.

In this specification **T** (the dependent variable) is the constant returns to scale technical efficiency score for each council in each year, **P** is a vector of relevant population data and **X** is a vector of socio-demographic and local government characteristics. Mu (**μ**) is an independent identically distributed random error term. All standard econometric tests were conducted and the residuals were confirmed to be near-normal in distribution (a critical assumption for valid statistical reasoning).

[9] An unfavourable Hausman test, as well as the particular characteristics of this cohort under analysis, augured against alternate panel regression techniques for this specific investigation.

Table 2. Definitions and Means of Variables, 2018-21

Variable	Definition	Similar Councils
Rates		
CRS TE (ln)	Relative technical efficiency, constant returns to scale	-0.405
Population		
Pop (ln)	Natural log of the population for each local government area	8.860
Pop2 (ln)	The square of the logged population	78.903
Density (ln)	Natural log of population density data for each local government area	0.068
Controls		
Median employee income	Median employee income (lagged), divided by 1,000	42.596
Median unincorporated business income	Median unincorporated business income (lagged), divided by 1,000	11.749
Aged	Proportion of people on an aged pension	13.586
Under 15	Proportion of people under the age of 15	19.878
DSP	Proportion of people on a Disability Support pension	4.570
Newstart (ln)	Proportion of people on a Newstart allowance, logged	1.389
Single (ln)	Proportion of people on a Single Parent pension, logged	0.415
IPPE (ln)	Natural log of the carrying value of infrastructure in ($'000)	12.752
Year	A dummy variable to control for the effect of different years	Not applicable
Amalgamation	A dummy variable to control for whether or not a council was amalgamated in 2016	Not applicable

In Table 3, we reproduce abbreviated results from the four-year regression analysis of constant returns to scale relative technical efficiency scores. Only statistically significant and important regressors have been included so that attention can be focussed on the most salient items.

Notably, population size proved to be a statistically significant regressor. Statistical significance means that a result is particularly important, and that great reliance can thus be placed on the association indicated. The response of the population variable is small (just over 0.0001 efficiency points lower per 1% reduction to population when a linear model was re-estimated), however it must be remembered that Walcha's population is an extreme low outlier. Indeed, Walcha Council is over 172 percent lower than the average for the fifty-seven peers which means that the overall materiality of the result should not to be disregarded.

The IPPE (infrastructure, property, plant and equipment) regressor was also statistically significant. Here the interpretation of the coefficient is relatively straight-forward – a one percent increase to IPPE value is equal to just over 0.002 decrease to the efficiency score. Once again, the relevant data point for Walcha is quite atypical – the IPPE at Walcha in 2021 was over $425 million, which compares *un*favourably to a cohort mean of $413 million. Moreover, the standard deviation (which measures the average spread of individual council results relative to the mean) was particularly high (almost $182 million) and thus provides even greater explanation for the effect of this variable on Walcha's technical efficiency. Notably, plant and equipment values at Walcha are relatively modest in comparison to the peer group and it can therefore be deduced that the large and burdensome road network of the local government area has had a material impact on technical efficiency. In this latter regard it is important to note that our review of the Asset Management Plan (AMP) suggests that Walcha is maintaining its roads at a higher frequency than some other comparable councils. Extending the time between maintenance activities thus has the potential to partially alleviate some of the financial burden of this environmental constraint.

Notably the proportion of people on an aged pension also had a negative coefficient and therefore a potentially deleterious effect on technical efficiency. However, this result was not statistically significant and therefore warrants relatively less emphasis.

Table 3. Multiple Regression Results, 2018-21 inclusive

	Extended Cohort
Population (ln)	-1.694* (0.726)
Population squared (ln)	0.106* (0.041)
Population density (ln)	-0.014 (0.026)
Aged	-0.001 (0.009)
Median employee income	-0.006 (0.004)
Median unincorporated income	0.003 (0.003)
IPPE (ln)	-0.229** (0.063)
Additional Controls	Yes
n	228
Coefficient of determination	0.2174

+p < 0.10, *p < 0.05, **p < 0.01. Standard errors in parentheses

In sum, it is clear from the econometric evidence that the challenging operating environment of Walcha Council does have a statistically significant and material impact on technical efficiency. Moreover, population size and road length are both largely outside of the control of key decision-makers. Therefore, it follows that at least part of the efficiency outcome will be resistant to the efforts of management (and also reform interventions[10]). Accordingly, management should concentrate on the things that it can control and largely accept that the effect of a challenging operating environment will likely mean that Walcha continues to perform well below its peers. From a community perspective this *a*typically challenging operating environment suggests that typical revenues are unlikely to be sufficient to achieve and maintain financial sustainability. In the absence of a competent system of horizontal fiscal equalisation grants this unfortunately means that the community may have to pay above average taxes and charges relative to the wider peer group.

In the conclusion that follows we outline the major initiatives that Council should consider in order to optimise its efficiency cognisant of the challenging operating environment at Walcha.

[10] Such as amalgamation – this would do nothing to increase population in the area, nor would it reduce the size of the IPPE burden.

6. Recommendations

Technical efficiency at Walcha Council is well below the levels of most of the peer group. Moreover, it has been so for at least a decade. Much of the reason for this relatively poor performance relates to the challenging operating environment of the local government area – especially the small, ageing and declining population, but also the extensive road network.

In this report we have raised four important measures that should be prioritised to improve relative technical efficiency:

1. Reduce the frequency of road maintenance. Current levels are around twice that of some comparable peers. We therefore recommend extending the duration between maintenance activities by at least fifty percent. We acknowledge that this will result in lower service levels, but the indications of our various reports are that the community cannot afford the existing levels of services that they receive. If the community is not prepared to accept lower standards of services, then inevitably rates will need to rise above the proposed SRV that we set out in our Capacity to Pay Report. We conceded that this trade-off is far from ideal, but it is reality given the fiscal circumstances confronting Walcha Council (compounded by a less-than-competent extant grant allocation scheme).
2. Consider the judicious use of debt to purchase equipment that is frequently hired (subject to a compelling business case and the available debt capacity – please see the Debt Report).
3. Reduce the number of Councillors at Walcha.
4. Maintain the reduction to the intensity of staff training activities in future years.

Council staff may well have additional suggestions for improving relative technical efficiency. However, we urge against counting on savings until they have actually been banked consistently over a number of years. Our lengthy experience with other local governments is that many reforms don’t actually deliver the promised savings. Moreover, savings tend to be absorbed elsewhere and thus often don’t improve the fiscal predicament of the local government. We therefore suggest that caution is warranted in this area and counsel that potential savings not be prematurely used to reduce proposed special rate variations. Indeed, catch-up provisions for SRV exist and it is thus a better plan to request and secure the much-needed proposed SRV first (and if additional savings do indeed arise later then perhaps some of the SRV might be deferred or reduced accordingly).   .

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