steer davies gleave

Depot Maintenance Review

Report
18 November 2016

Bus Éireann

Our ref: 22914601

Stertil Koni Skylift. IRTE Transport Engineer

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Prepared for:

Bus Éireann
Broadstone
Dublin 7

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Executive Summary

Overview

Bus Éireann commissioned Steer Davies Gleave to undertake a review of its bus maintenance depots. This review studies the differences between different depots and fleet types and is part of broader studies being undertaken by Bus Éireann looking at a variety of aspects.

Bus Éireann needs to have a greater understanding of its cost base and how shared costs should be attributed to various business lines. These factors include:

- Increasing competition, particularly on Expressway services.
- Financial pressures affecting the NTA and DoES budgets.
- The effects of EU1370 placing significant restrictions on the use of Direct Awards by the NTA for PSO services.
- Potential for legal challenge on state aid grounds or cross subsidies between supported and commercial services.

Terms of Reference

To achieve this greater understanding, Bus Éireann set Steer Davies Gleave a set of terms of reference as follows:

- Review the impact of changes in the business and regulatory environment on the future garage and facility network needs across the product portfolio.
- Analyse the operating costs related to the garage facility network.
- Review "Steady State" capital investment needs of garage network by location.
- Undertake a high level assessment of the "To Be" garage facility requirement in the short, medium and longer term.
- Assess and appraise scenarios for meeting the "To Be" requirement based on cost benefit/multi criteria analysis of each scenario.
- Recommendation on the most appropriate approach.
- Recommendation on a revised methodology for apportioning maintenance costs across the product types.

Structure of this review

To deliver valid and useful results and conclusions to Bus Éireann, Steer Davies Gleave has undertaken this review in the following staged manner:

- Analysis of significant amounts of data provided by Bus Éireann so as to attempt to understand the nature of bus maintenance in different depots.
- Review of the investment requirements for the existing depot premises on the assumption that Bus Éireann business is to go forward in the same manner as today
- An assessment of the impact of changes to the business/regulatory environment on depot investment plans and ongoing maintenance strategy, testing a series of "To Be" Scenarios against a "Do Minimum" base case
- A commentary on alternative methods for apportioning maintenance costs
- A commentary on opportunities to improve efficiency

A summary of the outcomes and conclusions from these stages are provided below.

Data analysis

The analysis undertaken has indicated that there is a wide spread in the efficiency of Bus Éireann depots. There is no one underlying factor which can explain the variation, but rather it is a complex combination of circumstances.

There appears to be potential for economies of scale at the smaller depots with less than 50 buses. This suggests that there may opportunities for economies from consolidating activity from smaller sites. However, large depots of more than 100 buses tend to show diseconomies of scale.

It is notable that certain depots consistently appear in the list of lowest or highest cost to maintain a range of bus types, which suggests that there may be opportunities to learn from best practice.

There appear to be marked differences in the relative cost of maintaining the same type of bus when used for service or for schools, indicating that future school bus cascades would benefit from careful planning.

The workforce composition is not consistent across depots. Levels of overtime working are surprisingly varied and do not seem to directly relate to depot size or levels of absence. Overtime per se is not necessarily a bad thing, but the current patterns suggest that it is driven more by local custom and practice than planned optimisation.

Facilities and available equipment levels vary considerably between depots, with several depots clearly over provided against current needs. Whilst this cannot be changed quickly, it does indicate potential for economies in future rebuilding.

“Steady State” investment needs

Bus Éireann has undertaken considerable work on analysing the condition of the current premises including a detailed report prepared by the Iarnrod Éireann Structural and Architectural Design Section.

The condition of several premises gives serious cause for concern about the ability to support continuing “Steady State” operations without significant investment. Problems include health and safety concerns, obsolete wiring and the presence of asbestos in some cases. Some investment is essential if these depots are to continue to be used; thus we have examined whether closing certain depots might provide a more economic solution.

Benchmarking suggests the typical outturn price for a new depot facility in Britain is close to €700k per bay, which is similar to BE’s own cost estimates. These costs have been used to inform estimates of rebuilding costs.

British garages vary between 11.4 and 17.7 buses per pit/lift bay. BE plans new build on a lower ratio of 10 buses per bay (which is less than the current level of provision at many depots). There is a potential trade-off between capital investment and a change in working practices to be considered when assessing future depot provision.

It is notable that Dundalk and Limerick featured prominently as being high priorities for remedial action, and in combination would require investment of €8 million. However, these depots also have notably low efficiency (DEA) scores which could be influenced by, but are not entirely driven by, the condition of premises. Therefore, before investing, it is appropriate to

consider whether a more fundamental review of the approach to maintenance activity is appropriate at these locations.

At Limerick, there is potential to move operations to the Bus Station when it is re-built, which would lower cost and/or allow more significant reconfiguration of the depot site.

Due to the size of required capital expenditure, consideration should be given to closure of Dundalk garage as soon as alternative arrangements can be made for maintaining the currently allocated fleet. There would also be scope to look at the future of Cavan and replace the inadequate leased premises at Kells as part of this move. Bringing the outsourced bus maintenance back in house would save circa €500k a year, on top of the reduced overhead from combining three sites into one. Future depot plans also need to recognise growth of commuting to Dublin which will affect medium/long term investment choices.

Broadstone is also a challenge. The desire to make alternative use of the Broadstone site means there would be merit in considering relocation to alternative premises, as an alternative to further investment in the current premises. This option was considered in one of the future scenario tests.

Impact of changes to business and regulatory environment

To assess potential impacts of a variety of possible changes in the Bus Éireann operating environment, a set of scenarios were agreed with Bus Éireann focusing on:

1. Efficiency improvements
2. Changes to models of operation for schools
3. Changes to models of operation of Expressway
4. Potential relocation of activity at Broadstone to other sites in Dublin
5. Studying the impact of tendering of PSO services

The scenarios, including sub-options to the scenarios, were subject to financial modelling to assess the impact on maintenance costs, depot investment and vehicle capex requirements. In addition the cost impact of associated restructuring, outsourcing and changes in operating patterns were assessed to give an overall cost benefit assessment. The analysis also took into account changes in income associated with the potential transfer of contracts to third parties.

To provide meaningful comparisons, 15 year NPVs were calculated for each scenario, using a 5% discount rate as currently recommended by the Department of Public Expenditure and Reform.

Scenario 1: Efficiency Improvements

This scenario used the results from the Data Analysis stage and looked at the cost effects of increasing the efficiency of all depots up to the current best levels achieved by Bus Éireann. It further assumed that, from 2025 onwards Bus Éireann would be make further improvements to bring its cost effectiveness of maintenance up to the same level of efficiency as achieved by a reasonable comparator, supported by a ten year period of additional fleet investment to reduce the average age and achieve greater standardisation.

This scenario delivers savings which rise year on year in real terms, and a positive NPV of €13.6m. The ability to deliver the level of improvements in the model may be constrained in practice by the economic environment, in particular the availability of capital to update the bus fleet or make depot improvements. It is also recognised that there may be industrial relations challenges associated with changes to working practices needed to deliver greater

labour efficiency, but the analysis demonstrates the scale of the potential benefits which could be realised.

Scenario 2: School Bus Changes

Two sub-scenarios were considered:

- Redistribution of the fleet to concentrate school bus maintenance at fewer depots
- Transfer of all school buses to sub-contractors

The first option produces an overall small negative NPV of €2.9m over the 15 year evaluation period. There are initial cost savings as capital expenditures at Longford and Dundalk are not incurred but this is offset by significant restructuring costs to compensate drivers and maintenance staff at locations being scaled down, which cannot be offset by transfer of staff to remaining sites.

The second option would see almost 500 buses are removed from the fleet. Five depots could then be completely closed and others significantly downscaled. Restructuring costs for voluntary severance and contingencies are expected to total €25.5 million. After allowing for loss of DoES income Bus Éireann would see a net loss of €21.1 million in NPV terms.

If Bus Éireann was to exit school bus operations, it would be necessary to review the whole business, as most locations have a mixture of schools and service buses. Removing the schools element risks making PSO and Expressway more costly, as overheads will be no longer be shared.

Scenario 3: Expressway Changes

Two options were considered:

- Sub-contracting the operation of 35 coaches, facilitating the concentration of maintenance of the remainder in 3 depots
- Sub-contracting all Expressway operations by 2020

The first option results in a marginal loss of €0.2 million in NPV, whereas the second would realise savings of €1.8 million.

Scenario 4: Broadstone Replacement Options

Continued use of Broadstone may not be a realistic long term option, and there may be additional, and expensive, unplanned repair work to undertake. Given these circumstances the focus needs to be on finding the most cost-effective alternative. The two options evaluated were:

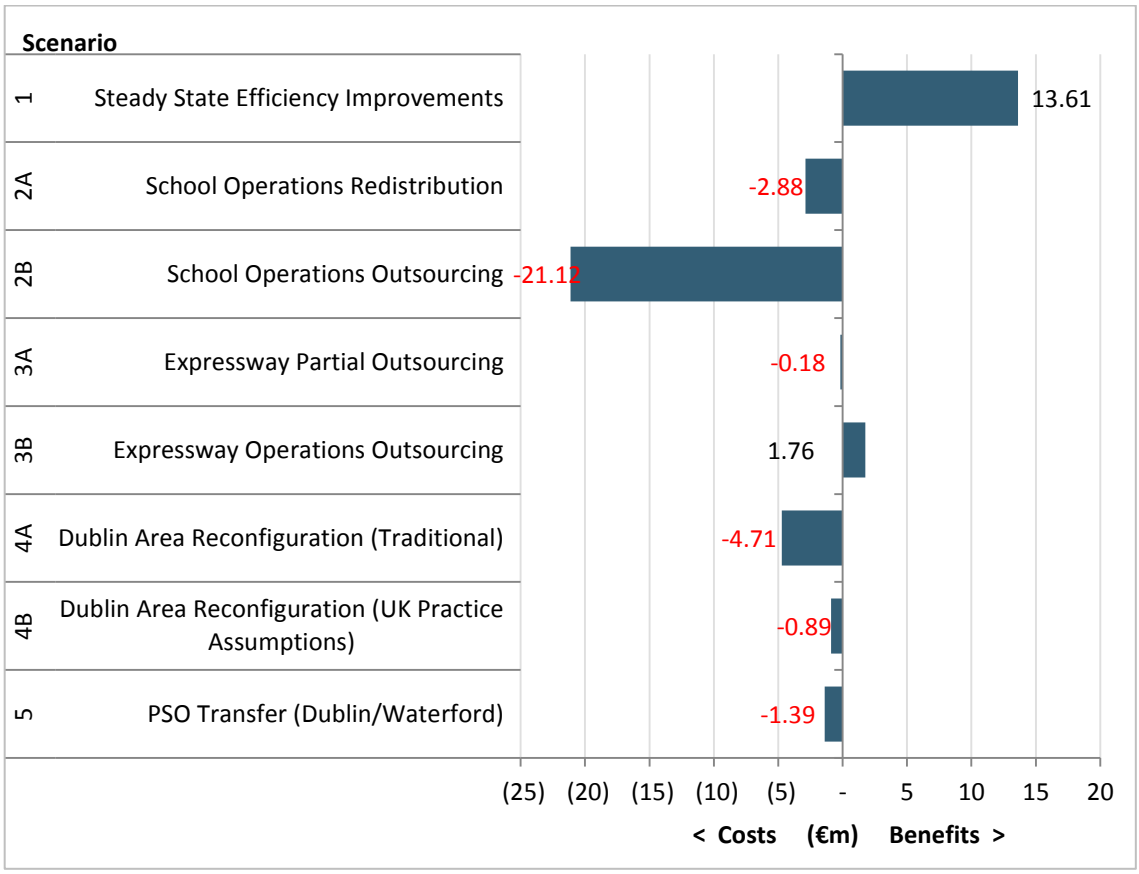
- A “like for like” replacement with 18 maintenance bays
- A smaller scale replacement designed around more intensive utilisation (24/7 working) with 12 bays

The “like for like” option yields a negative NPV of €4.7 million. The alternative approach requires lower capital investment (saving €3.6 million NPV) but these savings are partly offset by higher wage costs from round the clock shift working (an increase of €1.9 million). Overall NPV for the second option is still slightly negative at -€0.9 million but may still represent the best long term solution.

Scenario 5: Transfer of services following PSO competitive tendering

This scenario assumes that Bus Éireann loses the routes being competitively tendered by the NTA. As a consequence 4 depots are assumed to close following a redistribution of work and restructuring, resulting in a negative net NPV of €1.4m. This assumes that BE is fully compensated for the all costs associated with the operation of the transferred services in Waterford and Dublin, including currently allocated overheads.

Comparison of "To Be" scenario NPV versus the Do Minimum base case (€m)



Apportionment of maintenance costs

This part of the review explores the options for various methods of allocating costs to bus operations. It recommends two key points:

- That Bus Éireann improves the granularity of cost entries within SAP, so as to be able to more readily answer management questions.
- That Bus Éireann should use PVR as a method for apportioning centralised and overhead maintenance costs, except that the Schools PVR should be subject to a weighting factor to reflect the reduced number of docks per bus undertaken.

Opportunities to improve efficiency

There may be further opportunities for improving bus maintenance efficiency for Bus Éireann to consider :

- Whole life costing approach;
- A longer term approach to fleet planning and procurement, establishing deeper relationships with preferred suppliers;

- More intensive use of capital assets;
- Better tracking of costs and improved management information;
- Seeking opportunities for improved labour efficiency, including more a more consistent approach to shift patterns.

We have given an indication of the scale of benefits that might accrue from developing these strategies. These are necessarily high level estimates based on generalisations and should not be relied on without carrying out a more detailed review.

Key conclusions and recommendations

We make the following recommendations based on the results of our analysis:

- There is a good case for attempting to raise working efficiency first to the best in class level already achieved in Bus Eireann, and then to a higher overall level following adoption of a policy of consistently higher fleet investment to reduce average age, remove poorly performing bus types and achieve greater standardisation.
- Existing management information should be reviewed in terms of 'fitness for purpose', to ensure that there is adequate data to effectively monitor and manage activity levels and associated costs. Given the potential benefits in cost planning and control, we recommend that a working group is set up to investigate how this might be achieved.
- New or rebuilt depots with sufficient allocations and workload should consider moving to 24/7 operation in order to reduce capital costs.
- Planning for the replacement of Broadstone depot should commence as soon as possible, in order to avoid abortive expenditure on a sub-optimal facility.
- Due to the size of required capital expenditure, consideration should be given to closure of Dundalk garage as soon as alternative arrangements can be made for maintaining the currently allocated fleet. There would also be scope to look at the future of Cavan and replace the inadequate leased premises at Kells as part of this move and consolidate operations on a single site.
- There is no case for a wholesale redistribution of Schools work but there may be merit in adopting a more strategic and co-ordinated approach to route contracting, allowing a gradual consolidation to improve efficiency without incurring substantial restructuring costs.
- Exiting schools operations would not make financial sense and could adversely impact on the efficiency and cost of maintenance of the remaining fleet.
- The case for partial or full contracting of Expressway operations appears largely cost neutral from a maintenance perspective.

1 Introduction and context

Introduction

1.1 As part of its overall change/implementation programme for the Bus Éireann Strategic Plan 2015-2019, Bus Éireann wishes to undertake a review of the garage facilities utilised for delivering its network of services in response to changes in the business and regulatory environment.

1.2 Bus Éireann provides three principal business lines, each with distinct operating characteristics:

- PSO services contracted by National Transport Authority (NTA) - comprising a mix of provincial city/town services and peak period commuter services on routes into Dublin.
- Interregional services - Expressway branded commercial network generating high mileages per vehicle.
- Schools Transport Scheme - managed by Bus Éireann for the Department of Education and Science (DES) and partly subcontracted. These are generally low mileage operations.

1.3 Bus Éireann needs to have a greater understanding of its cost base and how shared costs should be attributed to various business lines. These factors include:

- Increasing competition, particularly on Expressway services.
- Financial pressures affecting the NTA and DoES budgets.
- The effects of EU1370 placing significant restrictions on the use of Direct Awards by the NTA for PSO services.
- Potential for legal challenge on state aid grounds or cross subsidies between supported and commercial services.

1.4 These factors require an increased understanding of the cost base as key management decisions will have to be made in the future that will fundamentally affect the financial performance of Bus Éireann and viability of services. It is also likely that these changes will require more transparency with regard to the division of shared costs between the different operating sectors.

Organisation and management

1.5 Engineering operations are organised in five regions, each with 3-4 depots, overseen by a Regional Engineer. The East and South regions have a large proportion of PSO service buses, while West and Northwest have a majority of school buses. South West sits somewhere between these two groupings.

1.6 All maintenance policy and procedures are determined centrally, although there can be some differences in the approach to implementation at a regional level. All maintenance staff wages are based on a common pay scale, although actual pay will vary, reflecting local shift patterns.

1.7 Bus Éireann has adopted maintenance best practice following UK VOSA type recommendations. The policy is to build on manufacturer specifications based on direct experience to ensure high standards are maintained. FTA UK provide independent audit checks.

1.8 Vehicles are attached to a specific depot, although some are then outbased (without any servicing support). Most planned maintenance is mileage based, although low mileage school buses follow a time-based maintenance regime instead. Where maintenance work is contracted out, BE documentation and standards are used.

Depot facilities, condition and need for investment

1.9 BE operates from a total of 17 depots. There is a mix of operations at 14 locations, with three sites dealing only with schools services. The largest depots are Broadstone (Dublin) with 156 vehicles (no schools); Cork; Galway; Limerick.

1.10 All depot premises are owned by CIÉ Group. The operating company has been granted a lease at nil rent, but is required to pay accommodation costs and undertake repairs. This means that the option of leasing new premises to replace existing sites will typically lead to higher cost to the company.

1.11 The properties were originally constructed between 1851 to 2009, and often converted from former railway premises. Many depot premises do not comply with current building regulations and most have not been modernised since the 1970s - only Galway has modern facilities. There is thus a substantial backlog of work required to bring these assets up to modern standards. There are understood to be issues around electrics, and at least one building has asbestos issues. In the absence of improvement works some depots may need to close on health and safety grounds.

1.12 An additional problem is that several of the older premises (including Broadstone) were built for the railways and are now listed buildings. This means that repairs must be carried out using equivalent materials, adding significantly to costs.

1.13 There is acknowledgement by stakeholders of historic under-investment. The Department of Transport has provided a strategic framework and accepts the need for investment to achieve a steady state position. However, pressures on the Exchequer have resulted in limited funding being available and in recent years spending priorities have been mainly focused on fleet renewal.

1.14 Investment funds for depot upgrades can be provided by the National Transport Authority (NTA) in the case of PSO services, and by a DES contribution in the case of school services. BE would be expected to directly fund any works benefiting commercial services.

Objectives and deliverables

1.15 The specific objectives and deliverables of the exercise were identified as:

- Analysis of the operating costs related to the garage facility network.
- Review "Steady State" capital investment needs of garage network by location, to bring facilities up to an acceptable standard.

- Undertake a high level assessment of the future ("To Be") garage facility requirements in the short, medium and longer term.
- Assess and appraise a range of scenarios for meeting the "To Be" requirement based on cost benefit/multi criteria analysis of each scenario, and provide recommendations on the most appropriate approach.
- Consider the methodology for apportioning maintenance costs across the product types, including potential alternatives.

2 Data collection and analysis

Introduction

2.1 Bus Éireann currently carries out work in a variety of ways, depending on depot location. Working arrangements include:

- Wholly in-house with direct employees
- Employing specialist sub-contractors on-site for specific activities
- Outsourcing activities to contractors who undertake maintenance work off-site

2.2 The balance between these approaches varies across the network, and in relation to the type of buses being maintained.

2.3 We needed a way of interpreting the available cost data and management information to understand the current level of efficiency and potential for improvement through adopting alternative maintenance strategies. Given the range of approaches, the variable mix of services and in the numbers and types of buses at each depot, it is not possible to make direct comparisons of the relative efficiency of different depots using one dimensional KPIs.

2.4 We have therefore applied a technique called Data Envelopment Analysis (DEA) to compare the performance of each depot and effectiveness of the local maintenance approach. DEA calculate relative efficiency scores for the depots, based on the inputs they consume and the outputs they generate (e.g. total depot costs), and allows them to be ranked accordingly.

2.5 DEA can reveal how efficiently each depot is using each input, which allows us to see why some depots perform better than others and can be used to suggest how the less efficient depots can be improved.

Data Envelopment Analysis

2.6 A range of data inputs were requested from Bus Éireann to underpin the analysis and construct alternative DEA models with various combinations of inputs and output measures.

2.7 Two alternative model formulations were found to be helpful. The first model compared input costs of labour, materials/contractors and overheads against service bus mileage and school bus numbers. The second, preferred model used the same inputs but used the number of maintenance events (docks) as the output.

2.8 The results presented in Table 2.1 show the relative efficiency of each depot to the best achieved by BE. Thus an indicator of 1.000 means that the depot is performing to the highest level, and a lower score means that there appears potential for improvement. **It should be noted, however, that the cost of maintenance included not only planned work, but also work arising, faults and accidents. Whilst the ratio should be similar most areas across a full year the results need to be treated with a degree of caution**.

2.9 The results are presented on the basis of constant returns to scale (CRS) and allowing for variable returns to scale (VRS). The ratio between the CRS and VRS measures (Scale) indicates whether there are economies of scale (increasing) or diseconomies of scale, i.e. where depots appear to become less efficient with increasing size.

2.10 From the results it can be seen there appear to be potential for economies of scale at the smaller depots with less than 50 buses, but that at larger depots of more than 100 buses there are generally diseconomies of scale. Small depots tend to be in more rural areas and large depots typically located in the main urban areas, which limits the scope for optimisation. However, these results are suggestive that there may opportunities for economies from consolidating activity from smaller sites.

2.11 As none of the four larger depots perform well on this analysis, it is recommended that a review of these depots is undertaken, with a view to understanding the factors which contribute to apparent diseconomies of scale, so that this can inform future planning.

Table 2.1: DEA results for docks model

	Buses	DEA CRS (Constant returns to scale)	DEA VRS (Variable returns to scale)	Scale	Economies of scale - direction
Athlone	50	1.000	1.000	1.000	
Ballina	77	0.982	1.000	0.982	Decreasing
Broadstone, Dublin	200	0.776	1.000	0.776	Decreasing
Cavan	48	1.000	1.000	1.000	
Cork	186	0.869	1.000	0.869	Decreasing
Dundalk (inc Drogheda)	86	0.743	0.839	0.886	Decreasing
Galway	103	0.829	0.977	0.849	Decreasing
Limerick	106	0.692	0.765	0.905	Decreasing
Longford	48	1.000	1.000	1.000	
Rosslare	33	1.000	1.000	1.000	
Skibbereen	24	0.966	1.000	0.966	Increasing
Sligo	27	1.000	1.000	1.000	
Stranorlar	29	0.678	0.682	0.993	Increasing
Thurles	34	0.707	0.814	0.868	Increasing
Tralee	43	0.786	0.789	0.996	Increasing
Waterford	64	0.689	0.737	0.934	Decreasing
Mean		**0.857**	**0.913**	**0.939**	

2.12 The results cannot be entirely definitive given the range of potential factors influencing efficiency. Nevertheless, it provides a useful guide and indicates that, irrespective of the approach adopted, six depots show up as significantly less efficient compared to the rest:

- Dundalk
- Limerick
- Stranorlar
- Thurles
- Tralee
- Waterford

2.13 The performance of Limerick, and especially Dundalk, is likely to compromised to some degree by the poor condition of the facilities, Waterford by the amount of work it carries out for Rosslare and Thurles by the heavy maintenance performed for Limerick.

Regional analysis

2.14 We compared the costs at a regional level. As can be seen below, the average cost per bus is not dissimilar across the regions (Figure 2.1). It is notable that there is much more of a variation in the average cost per bus within each region than between regions (Figure 2.2).

Figure 2.1: Average engineering cost per bus, by region

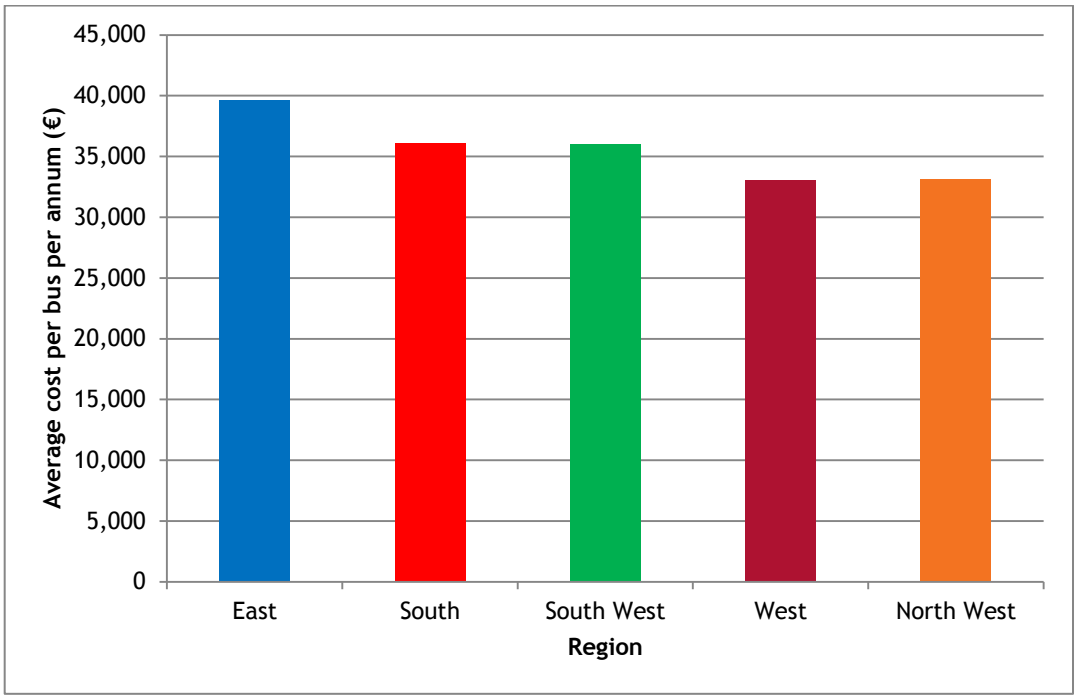
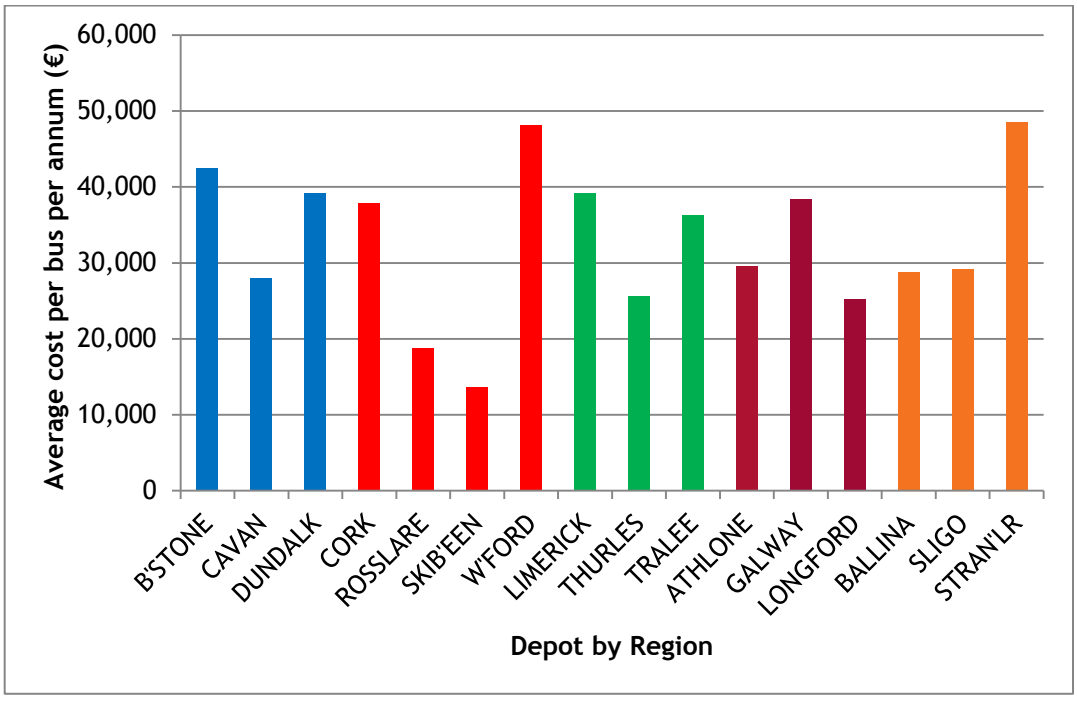


Figure 2.2: Engineering costs per bus by depot, regionally grouped



2.15 We carried out a number of analyses to attempt to determine the root causes of these variations in cost efficiency.

Fleet type analysis

2.16 A series of regression analyses were carried out on the DEA results looking at whether the variation in scores could be attributed to the average age of buses or the number of bus types being maintained. The exercise was inconclusive: the relationships were found to be very weak (measured by R^2 values). However, what indication there was suggests that older buses meant lower costs, possibly as a result of less systems complexity on older buses ($R^2 = 0.13$), and that fewer vehicle types contributed to greater cost efficiency ($R^2 = 0.11$).

Service buses

2.17 To look in more detail at the influence of specific vehicle types on performance, an analysis of the costs of maintaining different types of bus across different depots was undertaken. To avoid potential distortions, a minimum threshold of 150,000km operated was set.

Table 2.2: Cost comparison by service bus type

Fleet	Average Age of Fleet	Average cost €/km	Lowest cost v Average	Highest cost v Average	Lowest cost depot	Highest cost depot
AM	6.0	0.499	79%	132%	Sligo	Waterford
DD	11.5	0.762	75%	130%	Broadstone	Cork
LC	7.0	0.335	74%	182%	Waterford	Limerick
LD	5.1	0.559	77%	102%	Cavan	Broadstone
LE	3.0	0.251	98%	107%	Broadstone	Stranorlar
SC	6.5	0.281	56%	153%	Broadstone	Cork
SE	1.5	0.144	48%	314%	Ballina	Broadstone
SP	8.8	0.315	32%	304%	Ballina	Broadstone
SR	11.0	0.413	84%	120%	Dundalk	Cork
VC	12.0	0.314	39%	170%	Athlone	Cork
VG	11.0	0.375	82%	145%	Athlone	Broadstone
VWD	2.2	0.221	54%	131%	Broadstone	Galway/Cork

2.18 The spread between lowest and highest cost is surprisingly large. In terms of identifiable patterns, Cork appears to incur relatively high costs on many of its Service fleets. A possible factor could be the more demanding stop/start nature of city operations, creating additional wear on components. Broadstone has a mixture of the very good and very bad which may be a factor of the commuter routes.

2.19 Double deck type DD is the most expensive to maintain, followed by LD and AM. Some of the cost trends are broadly as expected, although AM costs seem particularly high given that they are 6 year old midi buses and VC and VG are holding up well for 11/12 year old large buses.

2.20 The cheapest bus type to maintain is the VWD, followed by LE and SC. It is difficult to see any definite pattern or common factor across these various bus types.

School buses

2.21 An equivalent analysis was undertaken for school buses, although given their low mileage, the cost was calculated on a per bus basis; a similar spreads in cost were seen.

2.22 Thurles performs well on this analysis, supporting the view that the DEA score is compromised by work done for Limerick. However, it is notable that **the highest costs are associated with outsourced maintenance**, particularly at Dundalk.

2.23 This is not surprising as BE cannot reclaim VAT, meaning the cost is added to labour, as well as any profit margin added by the supplier. Our analysis showed that there was an approximate 30% premium for outsourced work.

2.24 It should be noted that ML/MLS buses are only 29 seats, so considerably smaller than the other types, which at least partly contributes to their lower cost.

Table 2.3: Cost comparison by school bus type

Fleet	Average Age of Fleet	Average cost €/bus	Lowest cost v Average	Highest cost v Average	Lowest cost depot	Highest cost depot (OS = outsourced)
AS	8.4	13,932	35%	157%	Dundalk	Cavan (OS)
BS	8.4	22,799	71%	121%	Tralee	Dundalk (OS)
DVS	15.5	14,246	n/a	n/a	Thurles	n/a
ES	8.4	15,260	79%	150%	Sligo	Broadstone (OS)
IS	8.4	19,724	62%	190%	Stranorlar	Athlone
MH	16.0	29,550	75%	118%	Cork	Cavan (OS)
ML	18.0	9,527	n/a	n/a	Skibbereen	n/a
MLS	18.0	6,663	n/a	n/a	Skibbereen	n/a
SC	13.0	27,065	70%	131%	Thurles	Dundalk (OS)
SI	14.2	19,261	12%	147%	Thurles	Dundalk (OS)
SR	12.7	20,419	51%	179%	Thurles	Dundalk (part OS)
VC	17.2	18,632	58%	172%	Sligo	Cork
VR	14.9	18,291	24%	148%	Ballina	Dundalk (part OS)

2.25 Here there is far less correlation between cost and age, suggesting that the type of bus is a significant factor in determining the cost, with AC buses 35% more expensive than the similarly aged SR, and IS over 40% more expensive than the equivalent age AS.

2.26 To investigate further the effect of age on cost, we looked at the SC fleet, which is used on both Service and Schools across a wide range of depots and divided the total maintenance costs by the number of docks. It should be noted that costs include not only the planned maintenance, but also costs for ad hoc maintenance, such as faults and accidents.

2.27 SCs on Service vary considerably in age, from almost new (bought 2015) up to 11 years old. On Schools the age is much more tightly distributed, buses being either 11 or 14 years old, with slightly different proportions at each depot.

2.28 As can be seen from the Service Bus Figure, there is little correlation between cost and age. Of the three fleets with the highest age, only one (Dundalk) has one of the three highest costs.

While the depots with lowest age do have low costs, this may relate to the number of new buses, which will clearly have lower costs in the first year.

Figure 2.3: Cost comparison by depot of SC bus type – Service

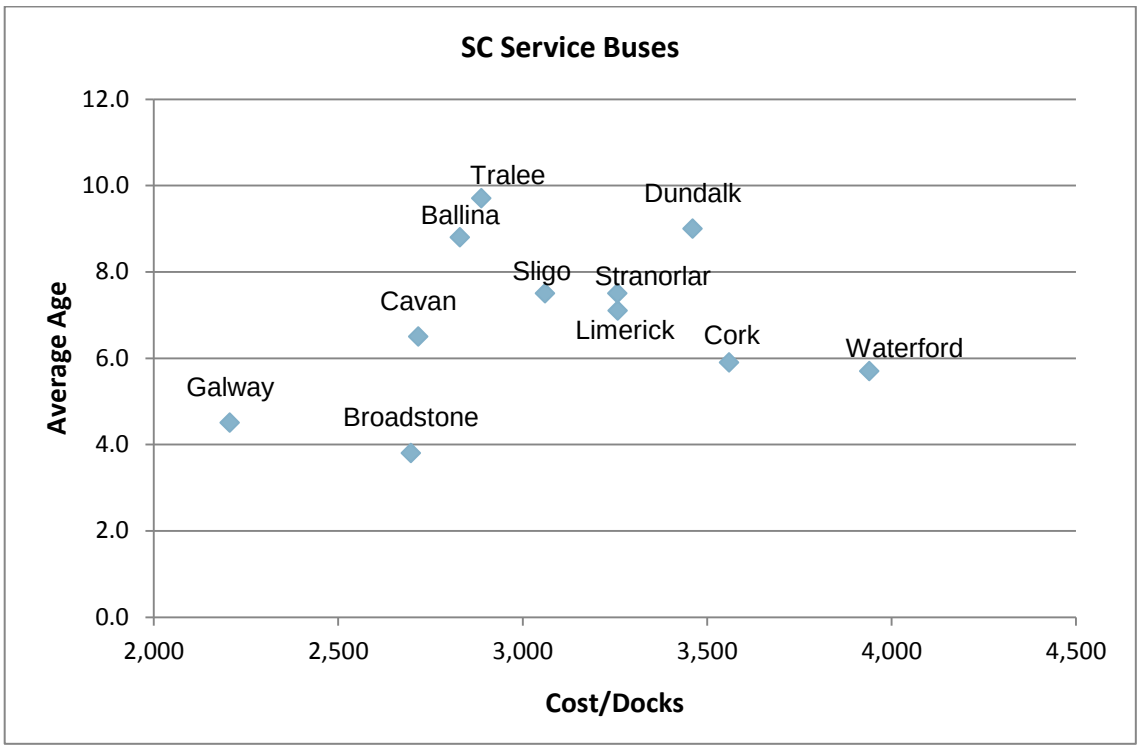
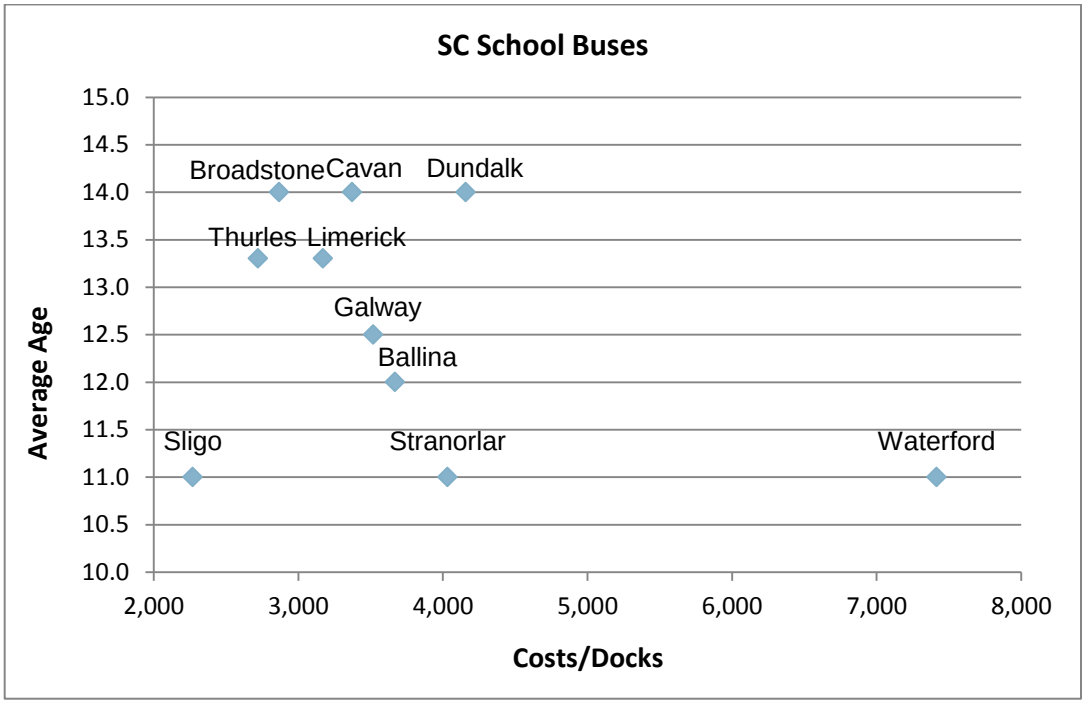


Figure 2.4: Cost comparison by depot of SC bus type - Schools



2.29 With the Schools buses all being a similar age we might have expected similar costs per dock across the depots. In practice they exhibit considerably more variety than for the Service buses. It should be noted, however, that there are small numbers of docks at several garages and so one-off breakdowns or accidents might bias the numbers.

Labour productivity

Cost per dock event

2.30 We sought to gain a better understanding of how differences in labour productivity contribute to differences in costs by location. In order to do so we examined the average maintenance hours divided by the number of docks performed. As noted above, maintenance includes unscheduled work, however given the data limitations this was a necessary compromise.

2.31 On Service buses (excluding Longford with a single vehicle), Rosslare shows up as using the least labour input per dock, followed by Broadstone, Cavan and Stranorlar. At the other extreme, Dundalk (including Drogheda) and Athlone show up as taking considerably more time per dock than the average. Sligo is also high.

2.32 Equivalent analysis for the schools fleet shows Rosslare again performing well. Ballina, Longford and Skibbereen also use fewer hours than other locations. However, Sligo, Limerick, Tralee and Cork all incur relatively high labour hours per dock.

Figure 2.5: Labour hours per dock – Service fleet

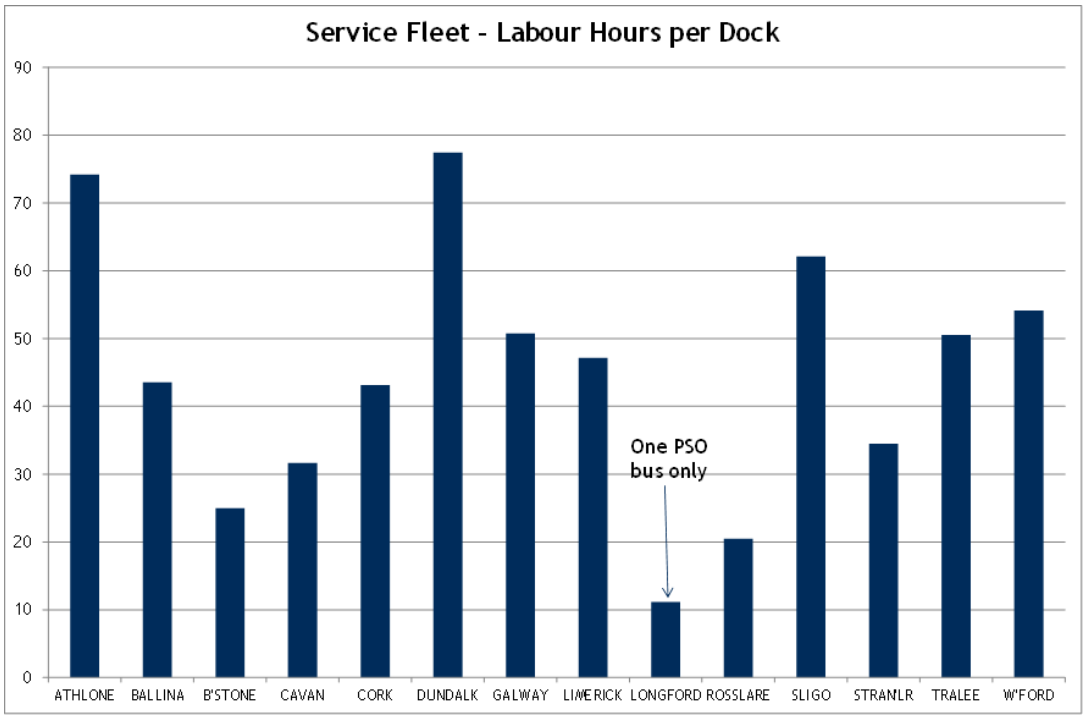
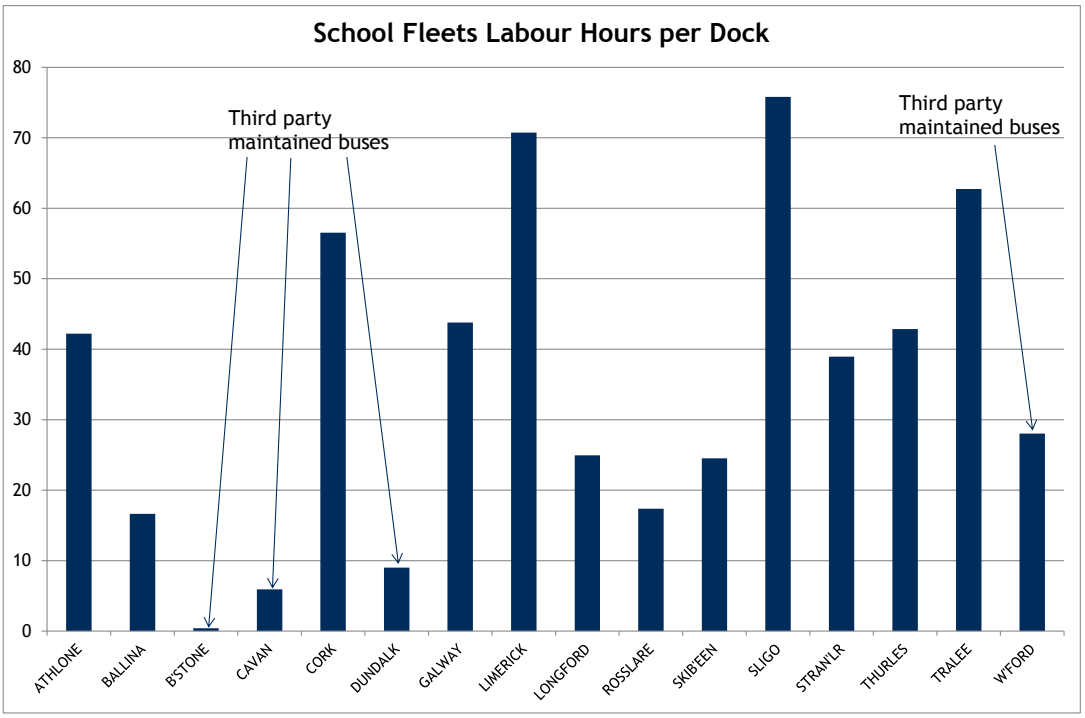


Figure 2.6: Labour hours per dock – Schools fleet



2.33 There are 22 different bus types in operation. Only three of these types operate both service and schools services. However, there can be marked differences in the maintenance costs on each type of duty: SCs is expensive in terms of cost per dock on schools, but mid-level for service; conversely VC is the second most expensive service bus but below midway in schools. This may illustrate the difference in sensitivity to mileage and age between the different bus types, which should be a determining factor when deciding which buses to cascade from PSO to schools operation with their distinctly different operating characteristics.

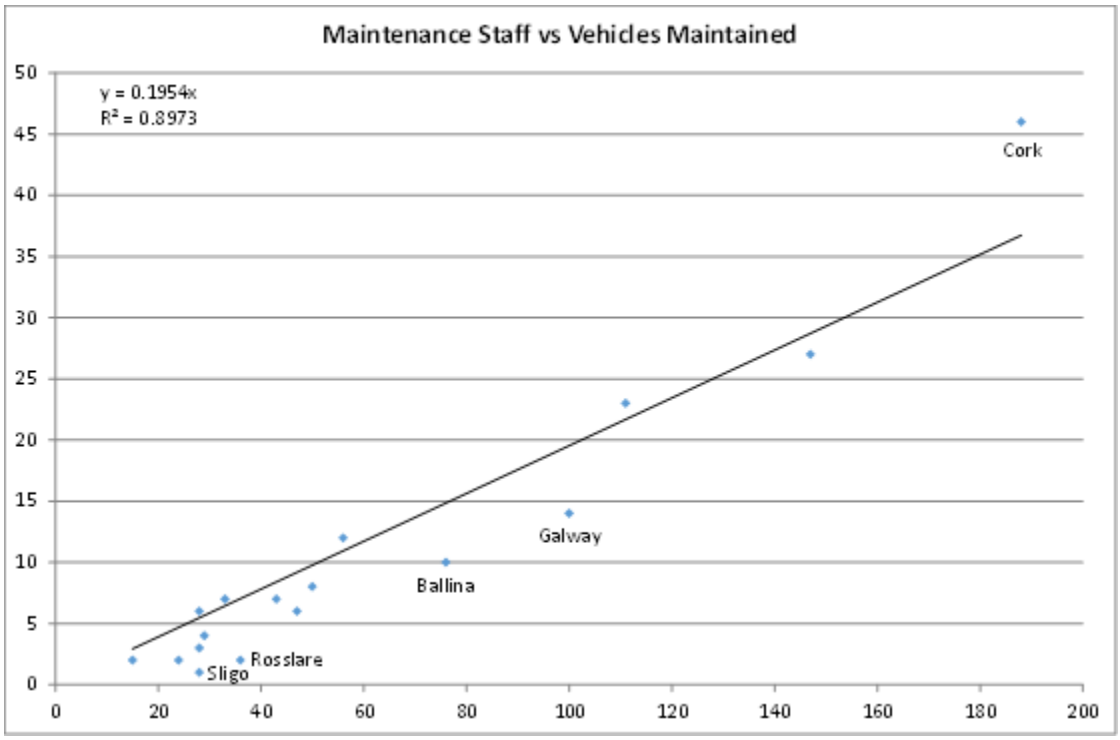
Staffing mix

2.34 BE has implemented a policy of creating multi-skilled workforce, with minimal demarcation issues between trades. There are only a limited number of specialists, including 3 electricians and 21 bodyworkers. All maintenance staff are on a common pay scale, although actual pay will reflect local shift patterns.

2.35 The total number of maintenance staff (including supervisors, mechanics, electricians and bodyworkers) are reasonably correlated with the numbers of vehicles directly maintained at the depot follows the expected upward trend (Figure 2.7). However, while Cork maintains the most buses, it also has the most maintenance staff per bus and it still has a relatively high level of overtime (15.6%). This may be a contributory factor to the apparent diseconomies of scale noted earlier.

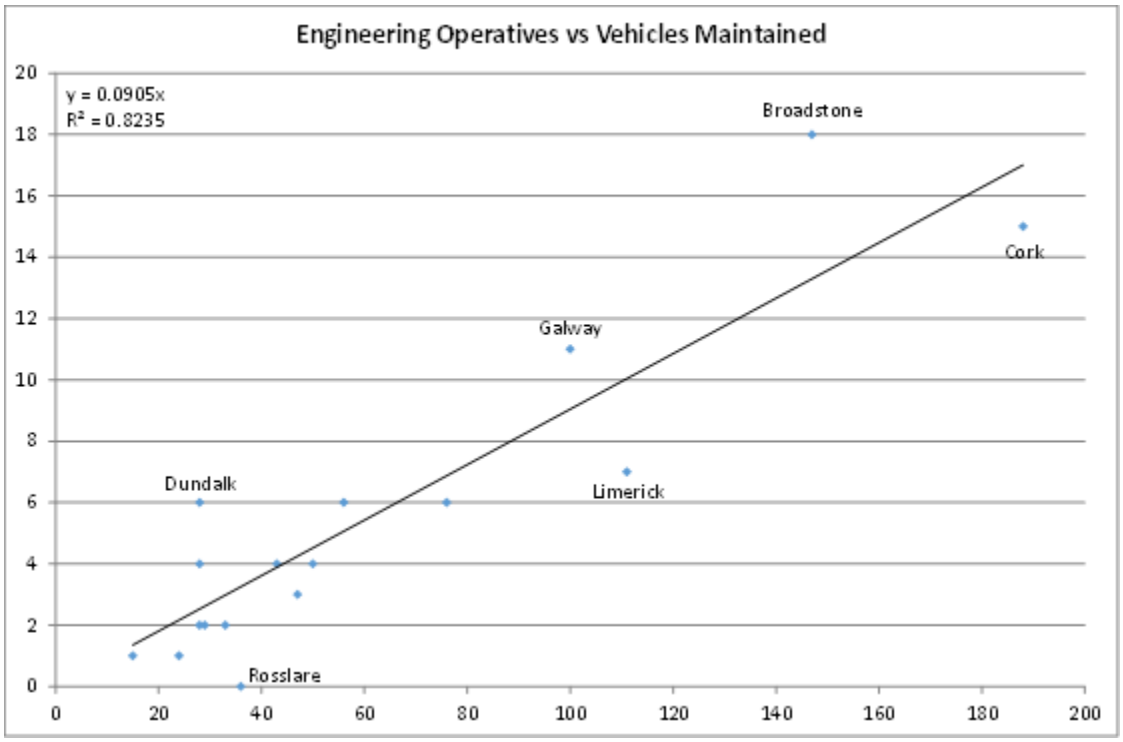
2.36 Conversely Galway, Ballina and Rosslare are running with relatively low staffing levels, although both Galway and Rosslare also incur high level of overtime (over 18%).

Figure 2.7: Maintenance staff compared to numbers of buses maintained



2.37 Focusing specifically on the number of Engineering Operatives (Figure 1.7), Galway and Broadstone have above the expected numbers. Proportionally Dundalk has an even higher ratio, with 6 EOs for 28 Vehicles. The cleaning regime at Limerick makes this an outlier, but Cork is also below trend. Viewing the two charts together there is some evidence of "offsetting", i.e. those with a low number of maintenance staff tend to have a high number of EOs, and vice versa.

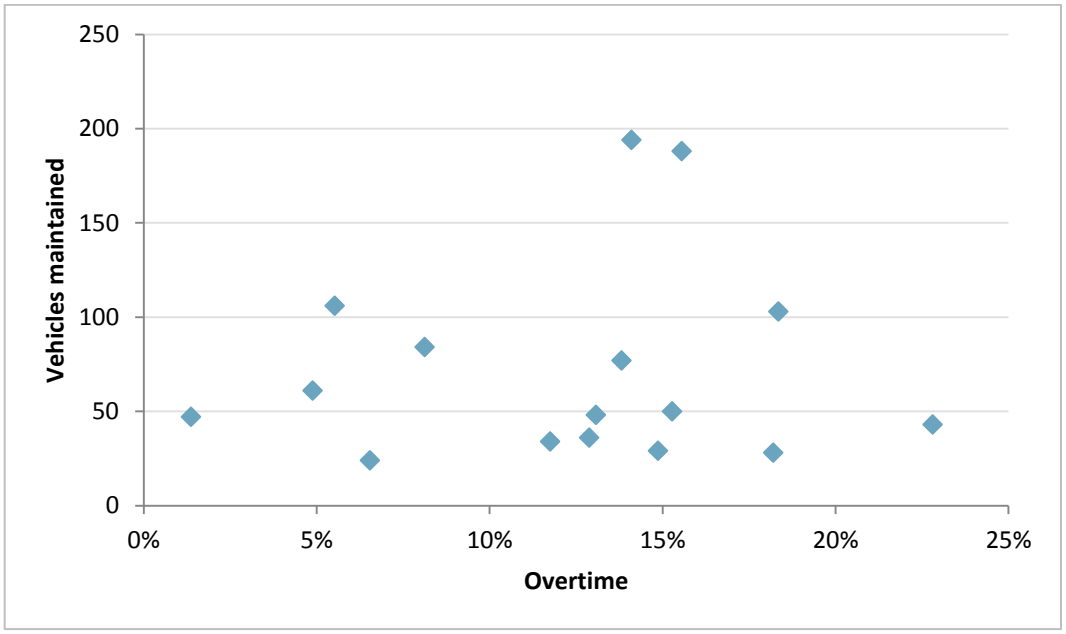
Figure 2.8: Engineering Operatives compared to numbers of buses maintained



2.38 Whilst there may be historic reasons for the differences in staff composition between depots, it would seem preferable to adopt a more consistent approach to staffing across the company, to the extent possible due to variations in depot scale and work content.

Overtime working

Figure 2.9: Overtime versus fleet maintained 2015

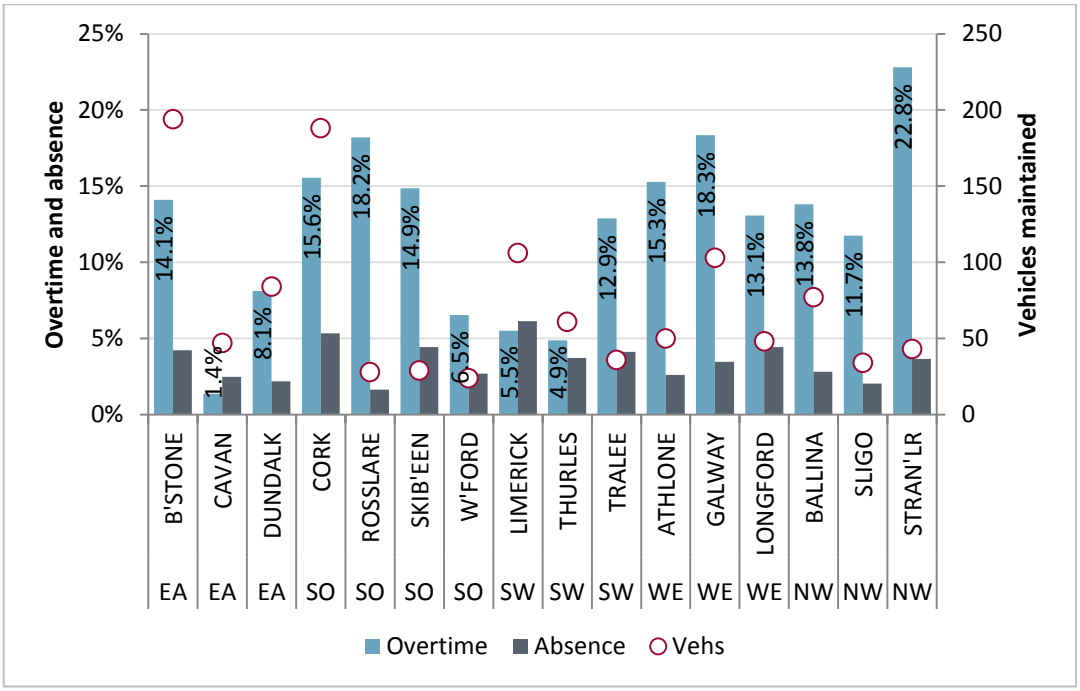


2.39 We understand that BE's current target for garage overtime is around 14%. For 2015 this level came in at 12.7% overall. The level of overtime worked tends to depend on grade, with

foremen/supervisors overtime highest at 21.7%, reflecting the fact that foremen, in effect, act as managers in more remote locations, carrying out health and safety related functions and facilities management in addition to normal engineering duties. Other overtime is reported to be aligned to covering for annual leave and replacements for short term absence.

Given these contributory factors, one would expect that small depots would tend to have higher levels of overtime, as annual leave cover can be built into a larger establishment. However, there is no correlation with depot size (vehicles maintained). Nor does there appear to be a close relationship between overtime worked and the levels of absence.

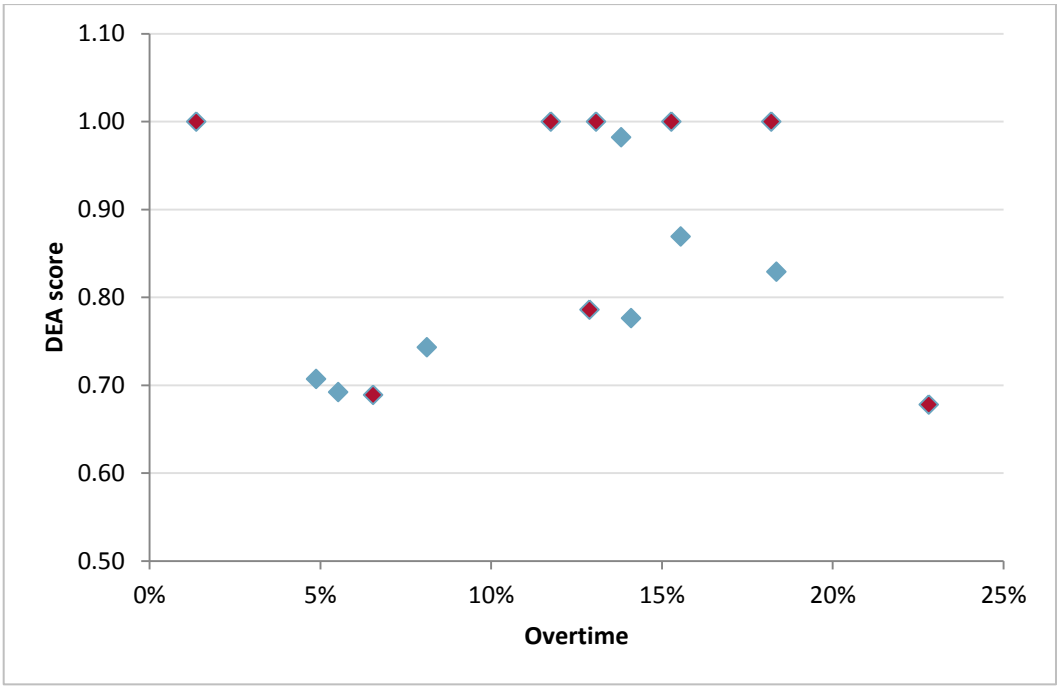
Figure 2.10: Overtime and absence rates 2015



2.40 We have looked at a potential relationship between the level of overtime worked and efficiency as measured by the DEA score. The results, shown in Figure 2.11, do not indicate any clear trend at an aggregate level. When split between smaller and larger depots (<50 and >50 buses respectively) there is an indication of higher efficiency / lower cost to maintain at larger depots with higher levels of overtime (R^2 of 0.50).

2.41 It is apparent that, at most depots with the exception of Cavan and Thurles, rates have increased overtime year-on-year, in some cases considerably. This suggests that local patterns of overtime working have become entrenched over time. There may be opportunities for cost savings from adopting a more consistent approach.

Figure 2.11: Overtime versus DEA efficiency score at constant returns to scale



Smaller depots with 50 or less buses marked in red, depots with more than 50 buses in blue

Depot facilities and equipment

Maintenance bays

2.42 The extent of maintenance facilities available can be a constraint on the potential efficiency of maintenance. We have therefore compared the number of maintenance bays available to the number of buses maintained at each depot (Figure 2.12). The average ratio is 6.5 buses per maintenance bay, and the larger depots tend to operate with a ratio of between six and eight. Some of the smaller premises operate with significantly higher, or lower ratios. The equivalent ratio across a sample of six recently built British garages was 10.7 buses per bay.

2.43 We also reviewed the provision of pits and lift equipped bays, as shown in Figure 2.13. There is a wider variation in the ratio of buses to pits/lifts than for maintenance bays overall. Around half of the depots are between 6 and 8 buses per equipped bay, and the average across all depots is 7.8. The equivalent ratio for the sample of British depots is 13.5. The variance is believed to be largely attributable to different patterns of shift working, with many of the British operators using multi-shift working compared with most BE maintenance being undertaken within a single shift working day. Clearly alternative shift patterns would allow for more intensive use of the available equipment.

Figure 2.12: Bays compared to number of buses

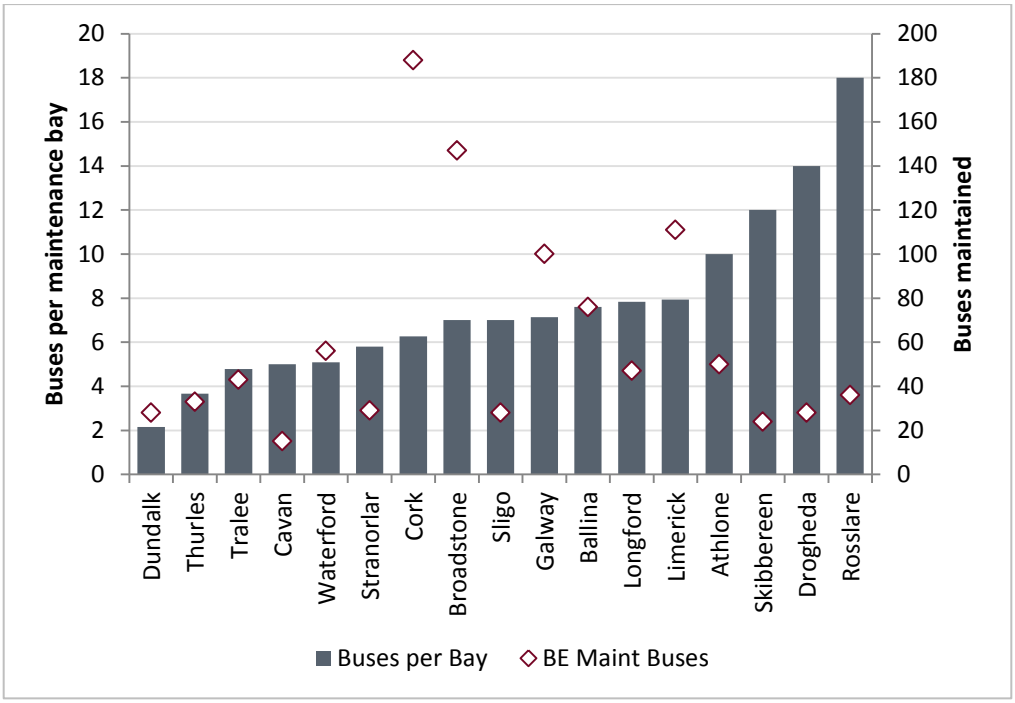
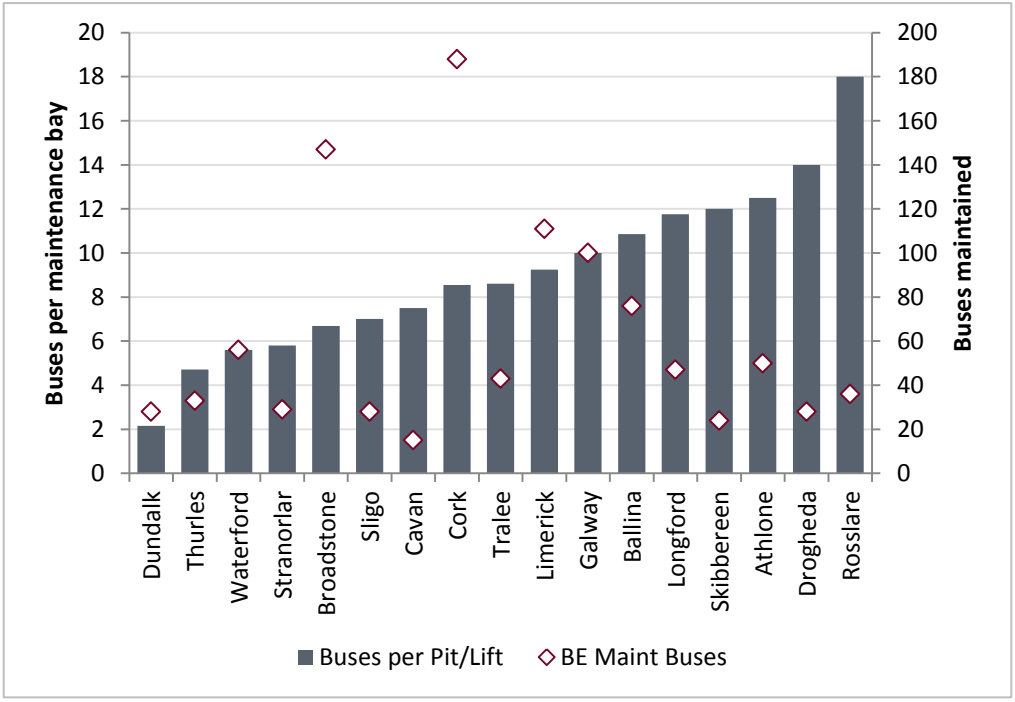


Figure 2.13: Pits & Lifts compared to numbers of buses



Summary of analysis findings

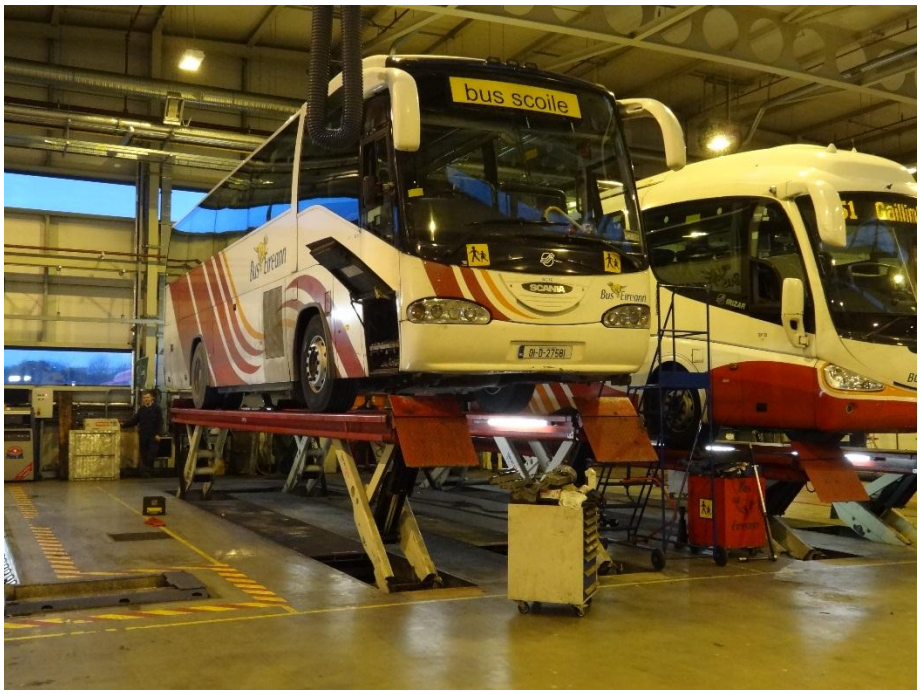
2.44 The analysis undertaken has indicated that there is a wide spread in the efficiency of BE depots. There is no one underlying factor which can explain the variation, but rather it is a complex combination of circumstances including the location and nature of the facilities, the range of vehicles being maintained and potentially a legacy of historic working practices.

2.45 There appears to be potential for economies of scale at the smaller depots with less than 50 buses. However, larger depots tend to show diseconomies of scale, the reasons for which are not immediately clear. Small depots tend to be in more rural areas and large depots typically located in the main urban areas, which limits the scope for optimisation, but there may opportunities for economies from consolidating activity from smaller sites.

2.46 It is notable that certain depots consistently appear in the list of lowest or highest cost to maintain a range of bus types, suggesting that there may be opportunities to learn from best practice. In addition, there can be marked differences in the relative cost of maintaining the same type of bus when used for service or for schools, so cascades must be carefully planned.

2.47 The workforce composition is not consistent across depots. Similarly, levels of overtime working are surprisingly varied and do not directly relate to depot size or levels of absence. Overtime per se is not necessarily a bad thing, as it can contribute to more effective use of capital assets and may contribute to higher cost efficiency in some circumstances. However, we suggest that it is carefully monitored to ensure all overtime is appropriate and necessary.

2.48 Facilities and available equipment levels vary considerably between depots, with several depots clearly over provided against current needs. Whilst this cannot be changed quickly, it does indicate potential for economies in future rebuilding, rather than needing to replace on a like-for-like basis. Moving to multi-shift working would also allow more productive use of available capacity, as indicated by the higher ratios of buses to equipment observed in Britain.



3 Review steady state investment needs

Condition of facilities

3.1 In addressing the "Steady State" capital investment needs it was necessary to review the range of facilities provided at existing premises, in conjunction with a high level estimates of the requirement for pits and/or vehicle lifts to accommodate for different fleet sizes and servicing plans. In several instances, the need for remedial work has been identified in order to ensure compliance with environmental or other regulatory requirements.

3.2 A comprehensive list of current maintenance capabilities and facilities at each garage was provided (see Table 3.1). In addition, we benefitted from a report prepared by Iarnrod Éireann (IE) Structural and Architectural Design Section, which gives an overview of the anticipated costs to improve each depot to meet current standards for buildings of a similar nature for inclusion in a Do Minimum investment case.

3.3 With the support of the BE Engineering team, site visits were made to a range of depot premises to observe the issues and constraints at first hand. However, we have not produced independent estimates of dilapidations or costs of remedial works. A summary description of each depot, their condition and planned work/cost estimate based on the IE report is provided in Table 3.2.

3.4 Each of the depots was given a condition grading on a scale from 1= Good to 5= Poor.

Risk grading and priorities for action

3.5 In order to identify the key risk locations a combination of the condition grading and DEA efficiency score was applied. The results are presented in Table 3.3. On this basis, Limerick and Dundalk are identified as the highest risk locations, followed by Waterford, Longford and Sligo (all rated 4.0 or above), with Broadstone rated 3.9.

3.6 In addition, priorities for investment were assessed on the basis total buses affected (whether directly maintained or not) and condition. On this criterion the most buses and worst condition is considered highest priority for action. We also considered an equivalent grading based solely on service buses (given that there is flexibility to outsource schools operations), and by buses maintained.

3.7 Broadstone and Limerick are the highest priorities for action across all the criteria, but Cork (Capwell) is also given a high rating given its scale. Dundalk also features high up the list. These are followed by Waterford.

Table 3.1: List of current maintenance capabilities and facilities

Region	East			South					South West			West			North West		
	Broadstone	Dundalk	Drogheda	Cavan	Capwell	Skibbereen	Waterford	Rosslare	Limerick	Tralee	Thurles	Galway	Longford	Athlone	Sligo	Ballina	Stranorlar
Maintenance Activities																	
Full BE Maintenance system	□			□				□	□		□	□		□	□		□
Road Passenger	✓	✓	✓	✓	✓	✗	✓	✓	✓	✓	✗	✓	✗	✓	✓	✓	✓
Schools	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CVRT / DOE Prep	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Small Accident work	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Deep Cleaning	✓	✓	✓	✓	✓	✗	✓	✗	✓	✓	✗	✓	✗	✓	✓	✓	✓
M&E Facilities																	
Compliant Electrical Installation	✓	✗	✗	✗	✓	*	✓	✓	✗	*	✓	✓	✗	✓	✗	✓	✗
Compliant Fire Alarm system	✓	✗	✗	✗	✓	*	✓	✓	✗	*	✓	✓	✗	✓	✗	✓	✗
Back up generator system	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗
Sprinkler System		✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗
Asbestos Roof	✗	✓	✗	✗	✓	✗	✗	✗	✗	✓	✗	✗	✗	✗	✓	✓	✗
Axial air compressors	✓	✗	✗	✗	✓		✓		✓	✓	✓	✓	✗	✗			
Energy efficent lighting	✓	✗	✗	✗	✗	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗	✓	✗
Rapid Roller shutter doors	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗

Region	East			South					South West			West			North West		
	Broadstone	Dundalk	Drogheda	Cavan	Capwell	Skibbereen	Waterford	Rosslare	Limerick	Tralee	Thurles	Galway	Longford	Athlone	Sligo	Ballina	Stranorlar
Vehicle Fuelling	✓	✓	✓	✓	✓	✗	✓	✗	✓	✓	✗	✓	✗	✓	✓	✓	✗
Opti Fuel dispensing & Fuel management system	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Timeplan fuel management system	✓	✓	✓	✗	✗	✗	✓	✗	✓	✓	✗	✓	✗	✓	✓	✗	✗
Merridale Fuel Management System	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✗
Permananent Ad Blue storage & dispensing	✓	✓	✓	✗	✓	✗	✓	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗
Distributed oil dispensing system.	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗
	□																
Vehicle Washing	□																
Bus Wash	✓	✓	✓	✓	✓	✗	✓	✗	✓	✓	✗	✗	✓	✓	✓	✓	✓
Chassis Wash	✓	✗	✗	✗	✓	✓	✗	✗	✓	✓	✓	✓	✓	✓	✗	✓	✓
Rain water recycling	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✓	✗	✗	✗	✗	✗
	□																
Vehicle Maintenance																	
Vehicle Inspection Pits	✓	✓	✗	✓	✓	✓	✓	✗	✓	✓	✓	✗	✓	✓	✓	✓	✓
Roller Brake test Pit	✓	✓	✗	✗	✓	✓	✓	✗	✓	✓	✓	✓	✗	✓	✓	✓	✓
Mobile column lifts	✓	✓	✓	✗	✓	✓	✓	✓	✗	✓	✓	✓	✗	✗	✗	✓	✓
Vehicle disgnostics	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Other																	
Tyre Contract fitter	✓	✓	✗	✗	✓	✗	✓	✗	✓	✗	✗	✓	✗	✗	✗	✓	✗

Table 3.2: Depot description and condition

Region	Garage	Owner	Buses	Vehicles Maintained	Description	Condition
East	Broadstone	CME	200	147	Detached five-bay two-storey former railway terminus, dated 1850	Renovated over many years. Requires new floor & drainage in main garage. Rewire completed in 2015. Basic renovation cost estimate at €2.5m + or- 20% . Construction costs of full replacement option with 14 bays and 136 parking spaces estimated at €15m + 0r – 20%
East	Dundalk (Dublin Road)	CME	86	46	Detached multi-bay single-storey former railway carriage works, built c. 1880 (extended)	Life expired. Building fabric and M&E services now require complete renovation. Design process in progress. Costs estimated ~€2-3m
East	Cavan	CME	48	9	Garage built ~1985	Requires replacement fuel tank, fuelling pad & associated interceptors. 2012 - upgrade of the yard to include a full resurfacing of the loading area, security fencing around the perimeter, installation of yard lighting, a corralled loading area and other Health and Safety modifications
East	Drogheda	CME			Garage built ~1985	Rewire required.
South	Capwell (Cork)	CME	186	188	Garage built & extended from 1930's.	2014 - electrical installation and yard works revamped. 2013 - new fuelling infrastructure, fuel storage, security hut, entrance including automated barriers, CCTV system, upgrade of waste water. Future Plans will be based on a new garage of reduced bays of between 10 to 14 bays at cost of €15m
South	Skibbereen	CME	24	24	Built ~2000	
South	Waterford (Ferrybank)	CME	64	56	Built ~1970's from converted aircraft hanger.	Electrical installation and yard works revamped in 2015. Roof replaced in 2010.
South	Rosslare	Leased	33	36	Leased Premises on Roche freight site. Modern ~ 5000 Sq. Ft. unit.	n/a

Region	Garage	Owner	Buses	Vehicles Maintained	Description	Condition
South West	Limerick (Roxboro Road)	CME	106	111	Built ~1950 but extended in 1970's.	Operations and garage office area now life expired. Building fabric and M&E services now require complete renovation. Planning permission received in late 2015. Detailed M&E design process in progress. Costs estimated ~€4.5m. Demolition of three bays of the existing maintenance/storage building towards the western boundary 620sq/m. A chemical store and office at the Northwest corner of the site 173.6 sq/m. A two storey security room at the Southwest corner of the main garage, 15.2 sq/m.
South West	Tralee	CME	43	43	Built ~1974 from converted aircraft hanger.	Electrical installation replacement due to begin shortly. Works due for completion Q2 2016.
South West	Thurles	CME	34	33	Built 1980's	Electrical installation replaced in 2014. New Brake test lane completed in 2015. Condition generally good
West	Galway	CME	103	100	Built 2009	Purpose built garage with fuelling, bus wash and chassis wash lines.
West	Longford	CME	48	47	Built 1950's. Steel frame corrugated barn type construction	Repair and renovation works ongoing. In 2015 small storage area extension, heating system replacement and roller door replacements. Working areas is limited, steel sheeting is uninsulated. Bundling nearing the end of its useful life. Requires substantial structural and M&E rework to satisfy building & fire safety regulations.
West	Athlone	CME	50	50	Built ~1973.	Electrical installation replaced in 2014. New Brake test lane completed in 2015. Condition generally good
North West	Sligo	CME	27	28	Built ~1950's from converted 1800's timber yard.	Ongoing repairs & renovations works. Requires substantial structural and M&E rework to satisfy building & fire safety regulations.
North West	Ballina	CME	77	76	Built ~1950's & extended.	Electrical installation and yard works revamped in 2011/2012. Site drainage renovation works to commence shortly.
North West	Stranorlar	CME	29	29	Built ~1980.	Electrical installation replacement due to begin shortly. Works due for completion Q2 2016.

Table 3.3: Priorities for improvement

Region	Garage	Owner	Efficiency rating (DEA, vrs)	Efficiency rating (DEA, crs)	Buses	Service buses	School buses	Vehicles Maintained	Condtion 1 to 5 *1 = Good / 5 = Poor*	Risk Grading = Condition/ Efficiency (DEA crs)	Priority Grading = Total Buses x Condition	Priority Grading = Service Buses x Condition	Priority Grading = Maintained Buses x
East	Broadstone	CME	1.00	0.78	200	154	46	147	3	3.9	600	462	441
East	Dundalk (Dublin	CME	0.84	0.74	86	57	29	46	4	5.4	344	228	184
East	Cavan	CME	1.00	1.00	48	9	39	9	2	2.0	96	18	18
East	Drogheda	CME							2				
South	Capwell (Cork)	CME	1.00	0.87	186	156	30	188	2	2.3	372	312	376
South	Skibbereen	CME	1.00	0.97	24	0	24	24	2	2.1	48	0	48
South	Waterford	CME	0.74	0.69	64	49	15	56	3	4.4	192	147	168
South	Rosslare	Leased	1.00	1.00	33	13	20	36	1	1.0	33	13	36
South West	Limerick (Roxboro	CME	0.77	0.69	106	72	34	111	4	5.8	424	288	444
South West	Tralee	CME	0.79	0.79	43	22	21	43	3	3.8	129	66	129
South West	Thurles	CME	0.81	0.71	34	0	34	33	2	2.8	68	0	66
West	Galway	CME	0.98	0.83	103	63	40	100	1	1.2	103	63	100
West	Longford	CME	1.00	1.00	48	1	47	47	4	4.0	192	4	188
West	Athlone	CME	1.00	1.00	50	12	38	50	2	2.0	100	24	100
North West	Sligo	CME	1.00	1.00	27	16	11	28	4	4.0	108	64	112
North West	Ballina	CME	1.00	0.98	77	19	58	76	3	3.1	231	57	228
North West	Stranorlar	CME	0.68	0.68	29	19	10	29	2	2.9	58	38	58

Capital cost benchmarks

3.8 In order to benchmark investment costs for new and upgraded premises we examined outturn costs of a series of recent bus depot redevelopment and construction projects in Britain. The investment costs and key indicators are shown in Table 3.4 below.

Table 3.4: New and redeveloped garages in Britain from 2011 to 2016

Location	Operator	Opened	Capacity (buses)	Investment	Bays	€ / Bay	Pits/Lifts	Buses / Pit or Lift set
Colchester	First	Sep-15	106	€4.5m	6	754,250	6	17.7
Swindon	Stagecoach	Feb-16	75	€4.1m	7	591,086	6	12.5
Thurmaston	Arriva	Oct-11	98	€6.5m	10	646,500	6	16.3
Shrewsbury	Arriva	Jul-12	48	€3.2m	8	404,063	3	16.0
Gateshead	Go Ahead	Feb-14	160	€11.0m	17	646,500	14	11.4
Manchester	Stagecoach	Mar-11	190	€8.4m	15	560,300	15	12.7

3.9 Further details of each of specific projects are given below:

- Colchester Quayside - New build on 2.34 acres, replacing two historic facilities; one which had a preservation order (due to Roman Wall). 6-bay workshop + VOSA test bay, fuelling and washing facilities, bus parking zones and ancillary accommodation.
- Swindon Cheney Manor - 5 pits and an area with vehicle lifts, DVSA test lane, washing facilities (with recycling), solar panels. Old site was constrained and in residential area. Build period of 44 weeks.
- Thurmaston - 1.33 ha existing leased site for head office and depot. £2.5m depot construction cost. 10 bays, 6 with lifts/pits. Also resurfaced external area (5500 m^2). Depot is an Authorised Testing Facility.
- Shrewsbury - 0.89 ha site, 5 vehicle lanes, 3 pit lanes, 6000m^2 paved area. 52 weeks build period.
- Gateshead Riverside - 17 bays, 2 lane fuelling and washing facilities, exhaust extraction system. 14 lifts/pits (2 in ground ram lifts, 2 x 20 tonne Skylift platform lifts, 9 sets of mobile column lifts, 1 pit/test lane); electricians shop, benched workshop area, body shop. 2 storey office block, includes mess room. 2.38 ha site, (3500m^2 workshops) Former power station requiring ground works. Cost includes land purchase. 50 weeks to build.
- Manchester Sharston - 12 pits (including 2 inspection pits), 3 sets of Stertil Koni lifts. 1.74 ha site (4,385m^2 workshop and office space).

Conclusions

3.10 The condition of several premises gives serious cause for concern about the ability to support continuing “Steady State” operations without significant investment.

3.11 Benchmarking suggests the typical outturn price for a new depot facility in Britain is close to €700k per bay, which is similar to BE’s own cost estimates. These costs have been used to inform estimates of rebuilding costs.

3.12 British garages vary between 11.4 and 17.7 buses per pit/lift bay. BE plans new build on a lower ratio of 10 buses per bay (which is less than the current level of provision at many depots). The variance between the two rates is largely attributable to different patterns of shift working, with

many of the British operators using multi-shift working compared with most BE maintenance being undertaken within a single shift working day. Therefore there is a potential trade-off between capital investment and a change in working practices to be considered when assessing future depot provision.

3.13 For the base, Steady State scenario the following capital investments are envisaged.

Table 3.5: Capital costs to be included in base case

Depot	Cost (€k)	When	Nature of main works to be undertaken	Implications for depot operating expenditure
Broadstone	400 2,500	2017 2018	Garage floor slab repairs Upgrade pits, office accommodation	Nil Overhead reduced by 5%.
Dundalk	2,500	2017-18	New structure	Overhead reduced by 60%; labour reduced by 10%
Cavan	250	2017	Numerous minor repairs and fuel tanks	Nil
Capwell	15,000	2019	Major rebuild	Overhead reduced by 40%; labour reduced by 10%
Rosslare	750	2025	New facility	Overhead reduced by 40%.
Limerick	5,500	2017	Staff block, stores area, washplant, lift, fuel mgt	Overhead reduced by 10%.
Longford	2,000	2018	Rebuild	Overhead reduced by 20%.

3.14 It is notable that Dundalk and Limerick featured prominently as being high priorities for remedial action, and in combination would require investment of €8 million. However, these depots also have notably low efficiency (DEA) scores which could be influenced by, but are not entirely driven by, the condition of premises. Therefore before investing, it is appropriate to consider whether a more fundamental review of the approach to maintenance activity is appropriate at these locations, which could lead to either increased investment or closure.

3.15 In the case of Limerick, there is potential to move operations to the Bus Station when it is re-built, which would lower cost and/or allow more significant reconfiguration of the depot site. However, while funding has been promised for the Bus Station, as yet there is no clear date for construction.

3.16 Neither Dundalk nor Cavan are fit for purpose, resulting in a large number of school buses being maintained externally. There is potential to combine the two into a new operating base, which could also replace the inadequate leased premises at Kells, providing a suitable location can be found and necessary funding secured. Bringing the outsourced bus maintenance back in house would save circa €500k a year, on top of the reduced overhead from combining three sites into one.

3.17 Broadstone is also a challenge; the former rail terminal is of historic significance and the area is currently designated as Z10, intended for mixed use development. It is located near Phibsborough's KDC and the future Dublin Institute of Technology Campus at Grangegorman. A Master Plan for the area includes a conservation strategy which will see existing buildings restored, including potential use of part of the site as a Transport Museum. The desire to make alternative use of the Broadstone site means there would be merit in considering relocation to

alternative premises, as an alternative to further investment in the current premises. Alternative models for replacement premises are considered in the “To Be” Scenario tests.

4 Assessment of impact of changes to business/regulatory environment

Introduction

4.1 Bus Éireann provides a range of products serving a variety of market needs. All are facing challenges because of changes to the business and regulatory environment in which BE operates.

- **Expressway** interregional services are primarily commercial operations, facing increasing competition from licensed private operators.
- **PSO city and commuter services** are operated under a Direct Award contract issued by the National Transport Authority, covering the period 2014-2019. However, the NTA is moving towards for market opening which could see initial entry of new operators and ultimately the gradual issuing of competitive contracts for pieces of existing Bus Éireann operations, with the risk of parts or all of operations in certain regions being transferred to other operators.
- The **School Transport Scheme** is administered by Bus Éireann on behalf of the Department of Education and Skills (DoES), and currently delivered with a combination of directly operated vehicles and contracted operations. The number of directly operated school buses has been reduced in recent years and it is understood that the DoES has accepted the case for BE to continue direct provision of around 500 large buses, which matches the current level of operations.

4.2 A workshop was held with Bus Éireann management to discuss and agree a range of future scenarios to model so as to assist Bus Éireann plan for the future.

4.3 Five core options were agreed, focusing on

- potential efficiency improvements;
- changes to model of operation for Schools;
- changes to model of operation of Expressway;
- potential relocation of activity at Broadstone to other sites in Dublin;, and
- adjustments following tendering and transfer of PSO services in Waterford and selected routes into Dublin.

4.4 For comparison purposes a "Do Minimum" case was also developed which assumes “business as usual” going forward with supporting essential investment to bring workshop facilities into line with required standards and regulations.

4.5 The Schools, Expressway and Dublin scenarios were each further divided into two sub-scenarios. Each of the scenarios can be considered independently, but also lend themselves to combination as part of an overall strategy.

4.6 The timescales required for full implementation of each the scenarios were considered in three phases:

- short term covering the next three years;
- medium term through to 2024;
- long term for initiatives beyond 2025.

4.7 A summary of the options is set out below.

Summary of Scenarios

Scenario 0: Do Minimum / Business as Usual

4.8 This assumes that necessary capital expenditure identified and costed by Bus Éireann would be incurred, but no changes were made to operations or current engineering practices.

Scenario 1: Steady state with improved efficiency

4.9 The results of the DEA indicate a wide spread in operating efficiency between depots. Some of the variation can be attributed to the nature of local operations (e.g. urban services with frequent stops put result in faster vehicle wear for a given mileage), or to the age of vehicles (required maintenance activity tends rise with increasing age). However, these factors do not fully explain the extent of the variation, and this suggests there is potential for improvement if best practice was adopted in all areas.

4.10 This scenario assumes that some of the differences in efficiency that the DEA indicated can be addressed over time and that, with fleet investment, further improvements are possible, based on the evidence of comparable operations.

Scenario 2: School Buses

4.11 Over recent years, BE has reduced the number of school buses operated from around 740 to close to 500. This has been achieved by the transfer of work to sub-contractors. This has commonly occurred when existing drivers have retired, rather than based on a strategic vision of the future pattern of schools service provision. Maintenance locations do not appear to have been rationalised in line with this reduction in activity.

4.12 Certain depots provide maintenance either exclusively or mainly for schools. These include Thurles, Longford, Cavan, Ballina and Athlone.

4.13 Two sub-options for the future model of school bus operations were considered:

Scenario 2A: School operations redistribution

- Concentration of school bus operations, allowing maintenance activity to be undertaken at fewer locations. This is assumed to be achieved by bringing some work back in house at the expiry of existing contracts and contracting out other parcels of work.

Scenario 2B: School operations outsourcing: contracting out all BE school bus operations

- Phased withdrawal from all school contracts

4.14 These changes are assumed to be capable of being fully implemented within a 3 year period.

Scenario 3: Expressway

4.15 Expressway PVR is currently 130 coaches provided from a fleet of 154 Expressway vehicles allocated across 12 depots.

4.16 This scenario looks at two sub-options to outsource operation of Expressway services:

Scenario 3A: Partial outsourcing of Expressway

- Subcontracting operations of a sub-set of Expressway routes, X7, X8, X12/13/14, X19/20, X33. This saves a total of 35 tri-axle coaches and has been assumed to take place from the beginning of 2017.
- With the reduction in fleet under maintenance it is assumed that work on the remaining coaches is concentrated at three locations – Dublin, Cork and Galway – from 2018.

Scenario 3B: Outsourcing of all Expressway operations

- This option represents an extension of 3A, contracting out operation of the remaining services by 2020.

4.17 In both cases it is assumed that the commercial design and planning of Expressway remains with Bus Éireann along with responsibility for ticket pricing, distribution and revenue risk. Contractors are deemed responsible for the supply of vehicles meeting Bus Éireann's specification.

Scenario 4: Dublin reconfiguration

4.18 Broadstone is no longer suitable for use as a modern bus maintenance facility but the structure has protected status. Repair works to enable continued operation are expensive given the need to respect historic building standards and use appropriate materials. Planning restrictions also limit the ability to create a more flexible space. Given the intent of the city council development plan to turn this historic site to better use as civic space or redevelopment, there is merit in considering the option of relocation to alternative premises.

4.19 Rewiring was completed in 2015, and repairs have been made to some of the colonnade sections. but the garage will require repairs to the floor slab, to rectify subsidence due to damaged drainage in the main garage, estimated at €400k. More extensive work to deepen and lengthen existing pits and upgrade staff accommodation has been estimated at €2.5m. However, this would be largely abortive expenditure if the site was to subsequently scheduled for closure. A more significant rebuild option, designed to make the current site suitable for the next 40 years has been estimated at €7m.

4.20 It should be noted that any rebuild or reconfiguration of the existing premises is likely to involve considerable disruption to current maintenance arrangements and may incur additional short term costs.

4.21 Relocating from Broadstone presents challenges but also an opportunity to secure premises suited to current vehicles and modern working methods, which can help deliver better working efficiency. It also represents an opportunity to build in capacity for future growth.

4.22 Building construction in the Dublin area will be expensive as land values are high. However, replacement maintenance facilities do not need to be within the city. Replacement may be on a single site or activities could be split between two smaller facilities closer to the main operating areas. There are lower cost sites available around the M50 and/or along the M3.

4.23 We consider two options for replacing the Broadstone facility:

Scenario 4A: "Like for like" replacement facility

- No change to the size of the allocated fleet
- A single depot sized to reflect current BE working practices
- 18 bays maintenance bays to service up to 180 buses, based on current operating ratios.

Scenario 4B: Reduced scale premises

- No change to the size of the allocated fleet
- Facilities scaled for 24/7 maintenance activity, with a smaller footprint
- Maintenance staff paid a shift premium to permit "round the clock" working.

4.24 Both Dublin scenarios assume that the handback of Broadstone to CIE attracts no compensatory payment, but that CIE would provide alternative land at nil cost to Bus Éireann.

4.25 The need for layover parking will remain for buses terminating at Busáras in the city centre or at the Airport. However, the principal demand for layover is between the peaks, it would make sense to consider alternative premises which have spare capacity at these times, potentially including bus depots used by Dublin Bus. For the purposes of these identifying replacement options for Broadstone, we have assumed that CIE will facilitate use of alternative layover parking costs do not change at no additional cost.

Scenario 5: PSO services competitive tendering

4.26 The terms of the current Direct Award from the NTA mandates the competitive tendering of circa 10% of PSO routes, which comprise of some Waterford city services, together with some routes into and around Dublin. It is are understood that the operation of these services will be subject to competitive tender during 2016 and be awarded by the NTA in 2017.

4.27 In this scenario it is assumed that these services will pass to other operators. Following the transfer there will be a requirement to review the distribution of maintenance activity related to remaining services.

Methodology

4.28 A financial model has been built to compare the various scenarios against the "Do Minimum", business-as-usual-case. This calculates a 15-year present value in 2015 prices (taking the annual effects through to 2030). This allows for clear comparison of changes, without needing to consider the effects of inflation.

4.29 In addition to implications for on-going engineering costs, the overall business case for the various scenarios also needs to take into consideration potential restructuring costs and impact on future operations costs, for example, where maintenance depots close and operations are relocated, or the differences in cost where operations are outsourced to third parties..

Data sources and assumptions

Source	Information
Fleet report	Fleet numbers at each garage, split by school, road and expressway buses
Dundalk/Cavan Schools Vehicles 01/02/2016 report	Details of buses maintained by external contractors
Garage P&Ls	Total labour and overhead costs incurred by each garage
Garage operating reports	Labour hours and material costs allocated to garages where the buses are registered
Work for other areas report	Re-allocation of labour hours to the garages where the work is undertaken

Capital Investment Estimate (Bus Éireann) and spend profile (SDG assumption)	Capital investment required at each garage under a 'Do Minimum' scenario, as well as labour and overhead cost savings that can be achieved through the investment
SDG assumptions	Real growth rates; Capital Investment: 0.0% per annum Labour: +1.0% per annum Material: +0.5% per annum Overheads: 0.0% per annum

4.30 The model combines information from a number of reports received from Bus Éireann together with assumptions made by SDG that have been shared with Bus Éireann. The following table contains a list of information that we have used together with the source.

Table 4.1: Sources used in the financial model

4.31 In addition, assumptions have been provided for the costs of voluntary severance terms for driving and maintenance staff, and of the expected profile of natural retirement, in order to produce estimates of restructuring costs. It should be noted that these are averaged estimates which may not map directly to the specific staffing profile at the locations affected.

General assumptions

4.32 The general assumptions applied are as follows:

- All cost inputs are assumed to be in € 2015 prices.
- Garage P&Ls allocate costs by the garage where the cost is incurred.
- Garage P&Ls provide total labour and overhead costs.
- CME and tyres costs refer to centrally purchased materials costs and outsourcing costs. These can be added to the material costs column to create a total cost allocated to the respective garage.
- Hours and costs in the garage operating report refer to additional costs that can be added to the P&Ls to create a total cost for the garage. Together, the costs are comprehensive of those incurred by Bus Éireann in relation to the maintenance operation.
- Hours in the garage operating report refer to labour hours and are only applicable to buses maintained at that garage i.e. they do not include hours incurred by buses that are outsourced
- Material and/or CME costs in the garage operating report include outsourced costs incurred by work undertaken externally.
- Hours and costs in the garage operating report reflect those attributed to the garage where the buses are registered, which may not be the garage where the work is undertaken.
- Materials that are allocated to the XX10 and XX20 bus type codes are variable costs which rise or fall in proportion to the number of buses maintained at the garage.
- All buses registered to a garage incur the same servicing cost and share of the XX10 and XX20 general orders charged to the garage. Where the work is pooled across two garages e.g. Athlone and Longford or Waterford and Rosslare, the adjustments for the servicing and general costs are also pooled across the total number of buses based at both garages.
- That the total 'in-house' fleet is 1,054 and outsourced fleet is 104, from reports received.
- No investment is needed to keep a garage operational unless specified in the proposed capex file sent to Bus Éireann on 8 April 2016.

The total maintenance cost for 2015 is calculated at c€40.8m, comprising: Labour € 16.1m; Materials €20.9m; and Overheads €3.8m.

4.33 The model assumes that capital costs will bring some operational cost savings, depending on the nature of the capital expenditure.

Net Present Value calculation

4.34 The analysis has been conducted over a 15 year time horizon, to produce a Net Present Value (NPV) estimate for each Scenario. In producing the NPV estimates we have applied the 5% discount rate recommended by the Department of Public Expenditure and Reform (PER) for public sector projects[1]. We note that PER advises that the discount rate for commercial projects undertaken by Commercial Semi State Bodies should use the relevant cost of capital or a project specific rate.

4.35 The NPV for each "To Be" Scenario is then compared against the equivalent "Do Minimum" case to show whether there is a potential business case, and the contributing elements of costs and benefits.

Scenario 1: Steady state with improved efficiency

4.36 This scenario considers the effects of improving Bus Éireann maintenance efficiency. In order to be realistic about the ability to implement necessary changes in working practices this was assumed to undertaken in a phased manner, as follows:

- Costs at garages below 1.00 in the DEA analysis, were reduced so as to improve their efficiency to the DEA norm of 1.00. The DEA report tells us what reduction in costs would need to be made to achieve this.
- It was assumed that a 50% improvement in the lower performing depots could be achieved over 3 years, 2017-2019. with the remaining improvements bringing all depots up to best BE efficiency levels attained by 2024.
- It was further assumed that from 2025, BE would be able to further raise efficiency (reduce cost) of maintenance up to the same level as a reasonably comparator operator who had applied a more consistent and higher level of fleet investment, with a reduced fleet age and fewer vehicle types.

4.37 Steer Davies Gleave selected a peer operator who operated a similar number of buses and mix of depots to Bus Éireann, and a broad spread of city, commuter, rural, express and schools operations. The comparator differs in one notable respect, in having adopted and applied a consistent approach to fleet procurement over many years, rigorously following a policy of standardisation by vehicle type and a commitment to regular fleet investment. As a result the comparator had an average fleet age of 6.8 years in 2014, compared with 7.4 years for the BE Service fleet and 14.6 years for the Schools fleet.

4.38 It has been assumed that to achieve the higher target levels of efficiency Bus Éireann would need additional capital investment to reduce the average age of the bus fleet. Spending an additional €2.5m a year over 10 years would allow:

- PSO buses reduced from an average 7.7 years to 5.5 years (restoring the 2011-12 position);
- School buses reduced by 5 years from an average 14.6 years to an average of 9.6 years;

[1] **http://www.per.gov.ie/en/project-discount-inflation-rates/** accessed 19 August 2016

- Expressway is assumed to remain constant at 3.5 years
- In combination this policy would result in a reduction in overall fleet age to 7.0 years.

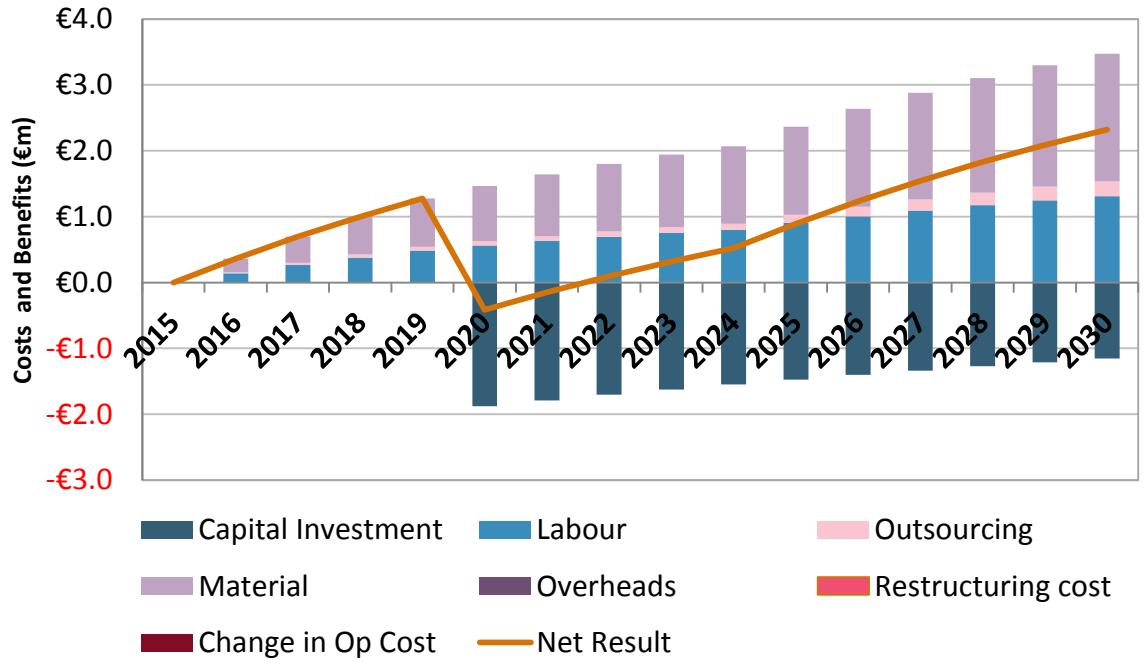
4.39 In the Scenario modelling the cost of fleet improvements (over and above maintaining existing fleet age) are assumed to begin in 2020. This will support the gains in efficiency to bring up all depots to the current BE best levels, and that the continued fleet age reduction, and greater standardisation of fleet types would allow efficiency to be raised to the same level as the comparator operator by 2030.

4.40 The results are regarded as a conservative estimate of the potential benefits, given that replacing the parts of the fleet incurring highest maintenance cost first should mean that more of the benefits are achieved earlier.

Implications

4.41 This scenario models a change in maintenance efficiency which delivers savings which rise year on year in real terms. The ability to deliver the level of improvements in the model may be constrained in practice by the economic environment, in particular the availability of capital to update the bus fleet or make depot improvements. It is also recognised that there may be industrial relations challenges associated with changes to working practices needed to deliver greater labour efficiency, but the analysis demonstrates the scale of the potential benefits which could be realised. The overall NPV is a positive €13.6m using a 5% discount rate. A breakdown by cost heading is provided in Figure 4.1 below.

Figure 4.1: Scenario 1 - Summary of net change versus Do Minimum in PV terms



Scenario 2: Schools

Scenario 2A: School operations redistribution to fewer depots

4.42 This scenario assumes that as a result of the reallocation of work, Longford, Dundalk and Skibbereen garages are closed. It is assumed that:

- Buses currently garaged at Longford will be outsourced or moved to an alternative garage.
- Most Dundalk buses will continue to operate, but all will be maintained by outsourcing.
- Buses currently garaged at Skibbereen will be outsourced or moved to an alternative garage.

4.43 Dundalk overhead costs have been split between Dundalk and Drogheda in line with staff numbers, so as to give an approximation of Drogheda's overhead costs.

4.44 Work for around 100 buses would affected, and this strategy is likely to result in some restructuring costs, as local work will be lost and staff may be unwilling or unable to transfer.

4.45 As a result of these changes there will be an increase in dead mileage for the current service buses based there (assumed to average 10km per bus per day, 6 days per week). There would also be a limited increase in maintenance mileage, for moving school buses to and from depots for periodic maintenance.

Implications

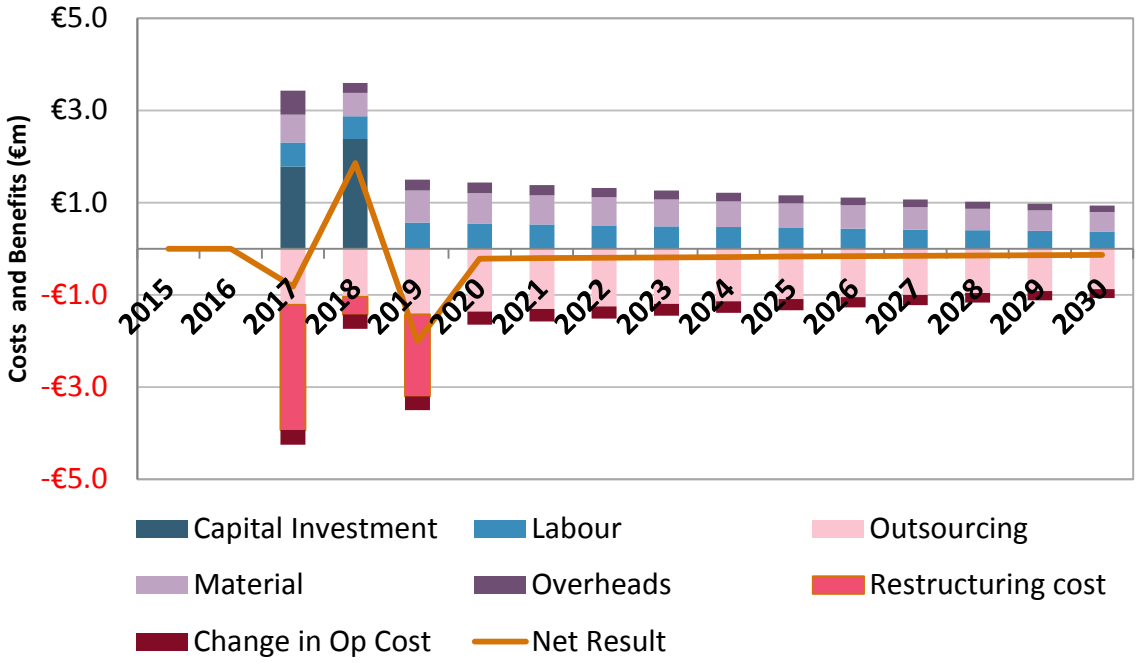
4.46 This scenario produces an overall small negative NPV of €2.9m over the 15 year evaluation period. There are initial cost savings as capital expenditures at Longford and Dundalk are not incurred but this is offset by significant restructuring costs to compensate drivers and maintenance staff at locations being scaled down, which cannot be offset by transfer of staff to remaining sites.

4.47 The remaining years assume a nil-cost effect of outsourcing and in-house maintenance at fewer locations. This assumption may be conservative and note that further savings should be achievable by concentration of maintenance. Outline calculations show that the monthly movement of school buses for maintenance can be cost effectively made over considerable distances.

4.48 In the long term maintenance savings from consolidation are largely offset by higher operating costs associated with higher dead mileage for the service fleet. It has been assumed that each affected bus will incur 10km extra running per day (6 days a week). If this was not the case, and the operational impact was neutral, the NPV would become a positive €0.7m.

4.49 In overall terms this scenario would only be worthwhile pursuing as part of a broader strategic plan which facilitates other rationalisation measures.

Figure 4.2: Scenario 2A - Summary of net change versus Do Minimum in PV terms



Scenario 2B: All School buses contracted out

4.50 This variant assumes that all school buses are contracted out over a period of three years. It has been assumed this is achieved on a garage by garage basis, as follows:

- Year 1: Dundalk and Longford.
- Year 2: Cavan, Cork, Waterford, Limerick, Stranorlar, Sligo and 50% of Ballina.
- Year 3: Skibbereen, Rosslare, Galway, Athlone, Tralee, Thurles and the remaining 50% of Ballina.

4.51 The order of contracting out is indicative of a ramp up over the three years but is not intended as a firm recommendation. It is assumed that this transition permits the closure of Dundalk, Longford, Thurles, Cavan and Skibbereen garages for the purpose of maintenance.

Implications

4.52 By the end of the third year, once all school bus maintenance has ceased, the maintenance saving is circa €10.7m a year in current prices.

4.53 The restructuring costs for voluntary severance and contingencies are expected to total €25.5 million, after allowing for limited natural retirement.

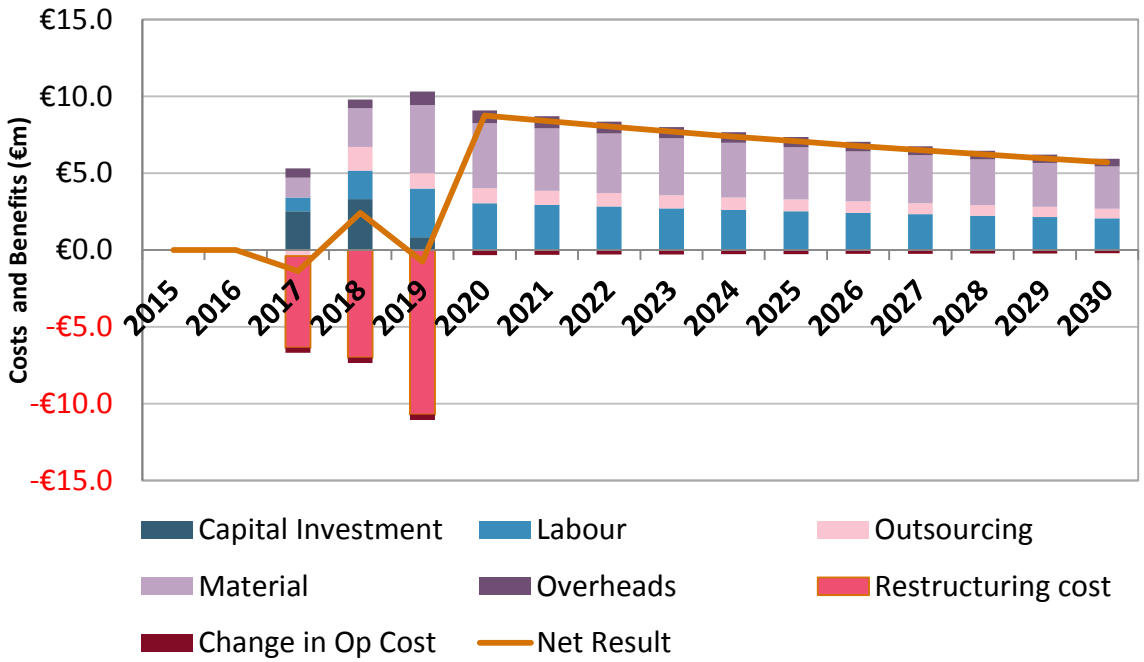
4.54 The model assumes a gain of €2.5 million related to the sale of the school fleet, at an average of €5,000 per vehicle, assuming purchase by a dealer over a three year period. However, the model excludes any additional capital benefits to BE from the consequent ability to dispose of higher value coaches which would no longer need to be cascaded onto school work, although modern designs are less suitable for this role than in the past.

4.55 In NPV terms the overall result appears substantially positive at €78.7 million. However, this ignores the loss of revenue from operating school services on behalf of the Department of Education and Skills, which is assumed to currently cover the related labour, maintenance and

overheads, including outsourced maintenance. If the apparent gains on those elements was excluded the result switches to a negative NPV of €21.1 million.

4.56 In addition, if Bus Éireann was to exit school bus operations, it would be necessary to review the whole business, as most locations have a mixture of schools and service buses. Removing the schools element risks making PSO and Expressway more costly, as overheads will be no longer be shared.

Figure 4.3: Scenario 2B - Summary of net change versus Do Minimum in PV terms



Scenario 3: Expressway

Scenario 3A: Expressway partial outsourcing

4.57 It has also been assumed that all Expressway Maintenance is consolidated at Dublin, Cork and Galway garages in Year 3 (2019). The consolidation has the effect of making Sligo too small to be viable, so it was assumed the garage would close and the remaining buses would be outsourced[2].

Implications

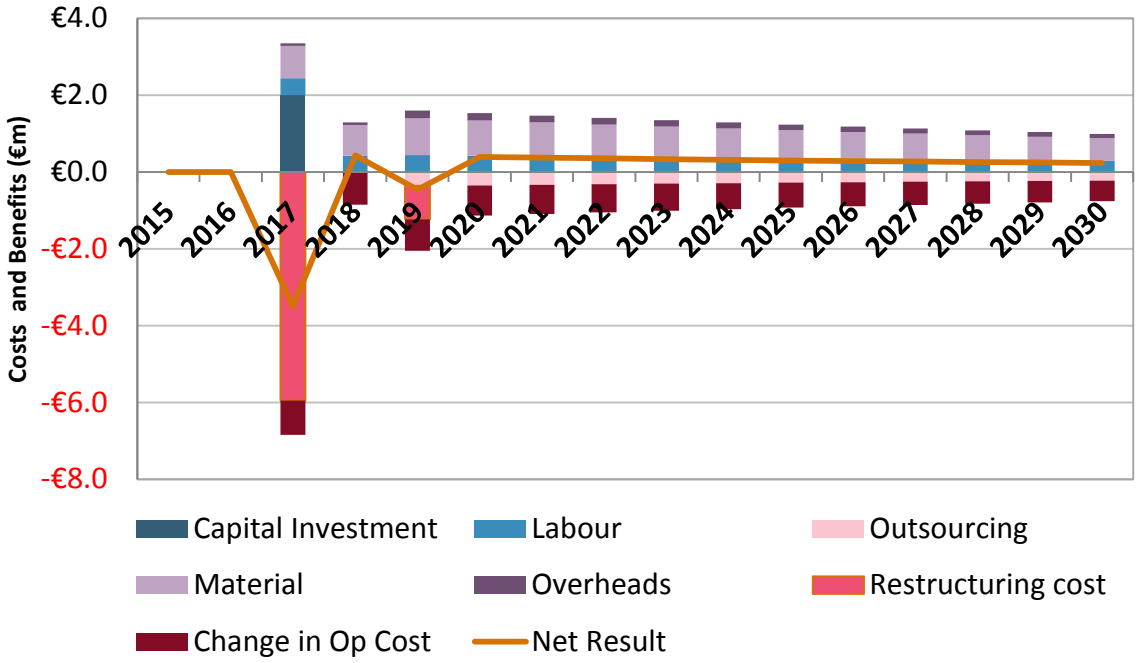
4.58 This scenario results in a reduction of €1.4m p.a. in maintenance costs. Offsetting this will be an increase in operating costs of around €0.9m each year based on the difference between contracted and direct operations costs.

4.59 There is a restructuring charges amounting to €6.8 million in NPV terms which drag down the potential gains, which together with proceeds from the sale of surplus coaches (at an average of €60,000 per vehicle) means the net case is marginally negative at €0.2 million.

[2] It is possible that some of these buses could be maintained at other locations, e.g. Ballina, in which case maintenance costs would reduce further, as the outsourcing mark-up would be saved, but this would be counteracted by higher dead mileage costs.

4.60 With Expressway maintenance concentrated in three depots it may be possible to further reduce the total Expressway fleet as the current arrangement sees some smaller depots having high maintenance spare ratios. It is also likely there will be some benefit accruing from locating specialist assets and spares in fewer locations.

Figure 4.4: Scenario 3A - Summary of net change versus Do Minimum in PV terms



Scenario 3B: Expressway complete outsourcing of operations

4.61 This scenario assumes full contracting out of all Expressway services in two stages:

- The same services as Scenario 3A are contracted out in 2017.
- All remaining Expressway services are contracted out in Year 4.

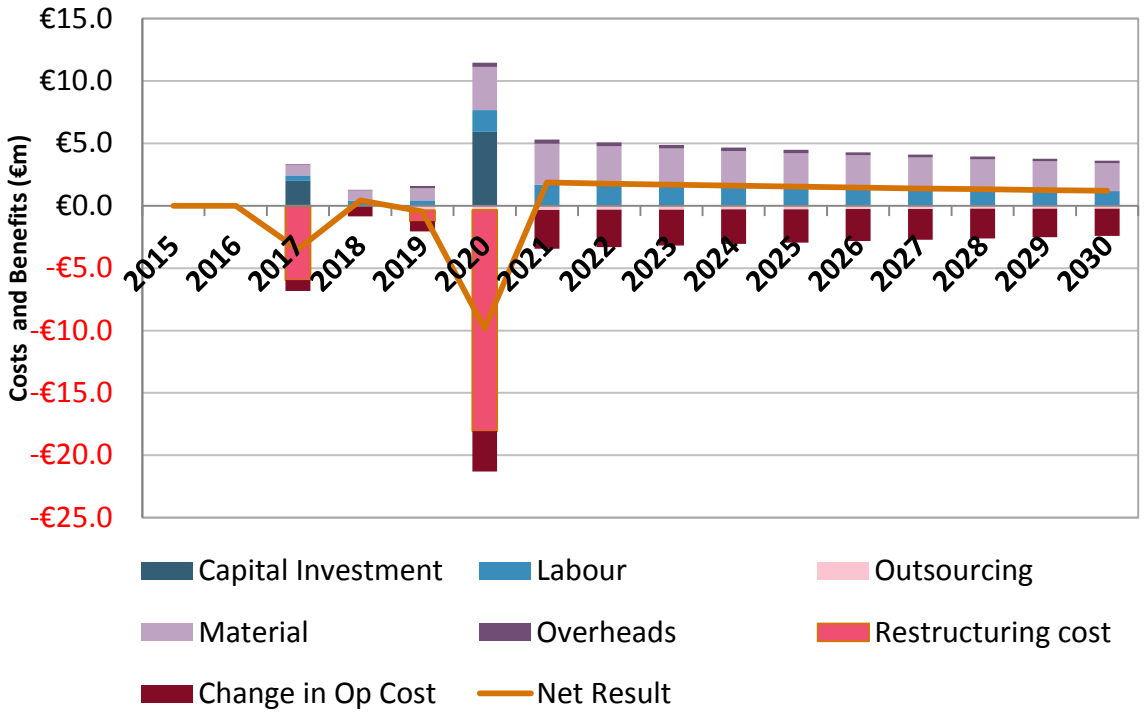
Implications

4.62 This scenario follows the same overall pattern as 3A, but on a larger scale. The end result is much the same with a small positive NPV of €1.8 million overall. This would be a major strategic undertaking for a comparatively small gain, unless there were perceived benefits from avoiding investment in future fleet renewal.

4.63 The scenario would also result in Dublin (Broadstone), Cork (Capwell) and Galway garages having considerable spare capacity. This may offer BE various further unquantified opportunities:

- A Broadstone replacement facility could be smaller than assumed in scenarios 4A and 4B;
- Potential to remodel Cork depot allowing for expansion of city services and/or the sale of some land;
- The three garages could take in more maintenance from other locations (or current sub-contractors) resulting in potential closure of Longford and Dundalk depots.

Figure 4.5: Scenario 3B - Summary of net change versus Do Minimum in PV terms



Scenario 4: Dublin Broadstone depot replacement

Scenario 4A: Like-for-like replacement with traditional maintenance practices

4.64 The existing depot has 22 bays but this reflects the inflexible nature of the existing site. Based on future capacity needs of 180 buses, 18 bays would be required at an estimated cost of €650k plus VAT (reduced rate) per bay, giving a capital cost of €13.3m. Overhead costs were assumed to be €50k per bay, per annum. This is equivalent to the cost at Galway and also close to the average cost per bay over the whole of Bus Éireann.

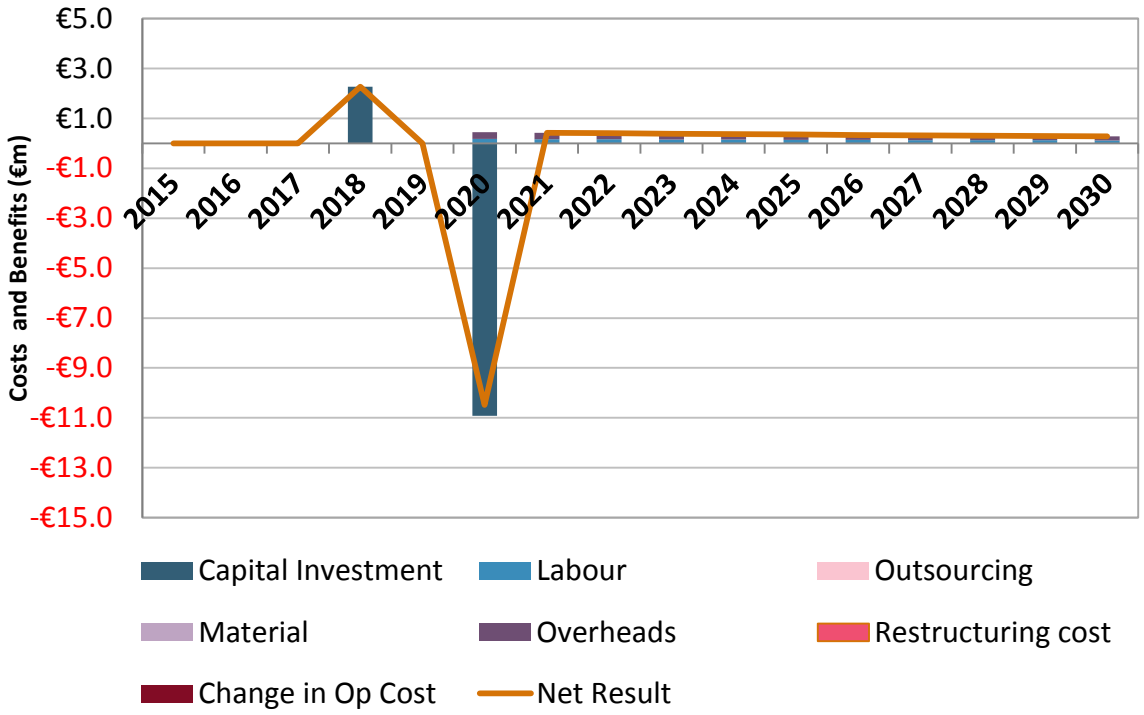
4.65 If site identification and planning work was put in place quickly, the new depot could be built and operational in 2020. Limited repairs to make the existing depot safe would still be required at a cost of €400k.

4.66 There would be potential for productivity improvements available from a combination of a more efficient layout and better equipment. It is assumed that a staff reduction of 10% is possible. Unit staff wage costs were assumed to remain as in the Do Minimum.

Implications

4.67 In overall terms this option yields a negative NPV of €4.7 million. However, it should be borne in mind that continued use of Broadstone may not be a realistic long term option, and there may be additional, and expensive, unplanned repair work to undertake. Given these circumstances the focus needs to be on finding the most cost-effective alternative.

Figure 4.6: Scenario 4A - Summary of net change versus Do Minimum in PV terms



Scenario 4B: Reduced scale replacement with adoption of 24/7 operation

4.68 This scenario assumes that Broadstone is replaced by a smaller facility with 12 bays, which will be able to service up to 180 buses, assuming full maintenance activities take place 7 days a week 24 hours a day. No change was assumed to the fleet from that in the Do Minimum.

4.69 Based on a cost of €650k plus VAT per bay, this gives a capital cost of €8.9m. Again, the facility could be ready by 2020.

4.70 Overhead costs were assumed to be €65k per bay, per annum, 30% more than the cost of traditional operation, reflecting the higher intensity usage of the bays.

4.71 Working efficiency is assumed to increase by 10% as in Scenario 4A. However, wage costs are assumed to increase based on a change from mainly two-shift to three-shift working, with shift premia payments rising to 30% from 15%.

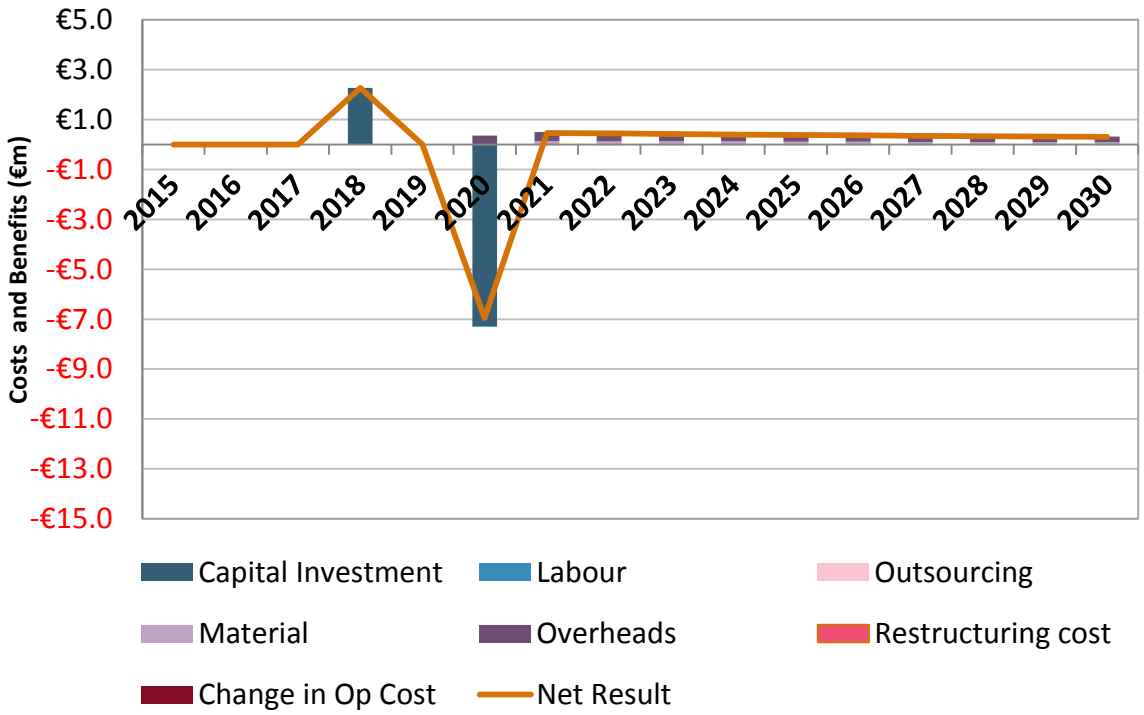
4.72 Adopting three shift working will also mean the level of spare vehicle cover can be reduced, as buses can be returned to service more quickly. Current provision of over 15% spare cover could therefore be reduced to 10% (based on comparable operator ratios), reducing the maintained fleet from 154 buses to 147 after the first year, saving on materials costs. This would also contribute towards lower fleet replacement costs in the long term, although this has not been factored in to the assessment.

Implications

4.73 Lower capital investment under this option (saving €3.6 milliion NPV) is partly offset by higher wage costs from round the clock shift working (an increase of €1.9 million). In terms of overall NPV the case is still slightly negative at -€0.9 million. However, this may offer the best long term

solution, and is a substantial improvement on a replacement depot planned on a like-for-like basis.

Figure 4.7: Scenario 4B - Summary of net change versus Do Minimum in PV terms



Scenario 5: PSO services competitive tendering

4.74 This scenario concerns the tendering of PSO services at Dublin and Waterford. It has been assumed that these services would transfer to a third party in 2017 (Year 1).

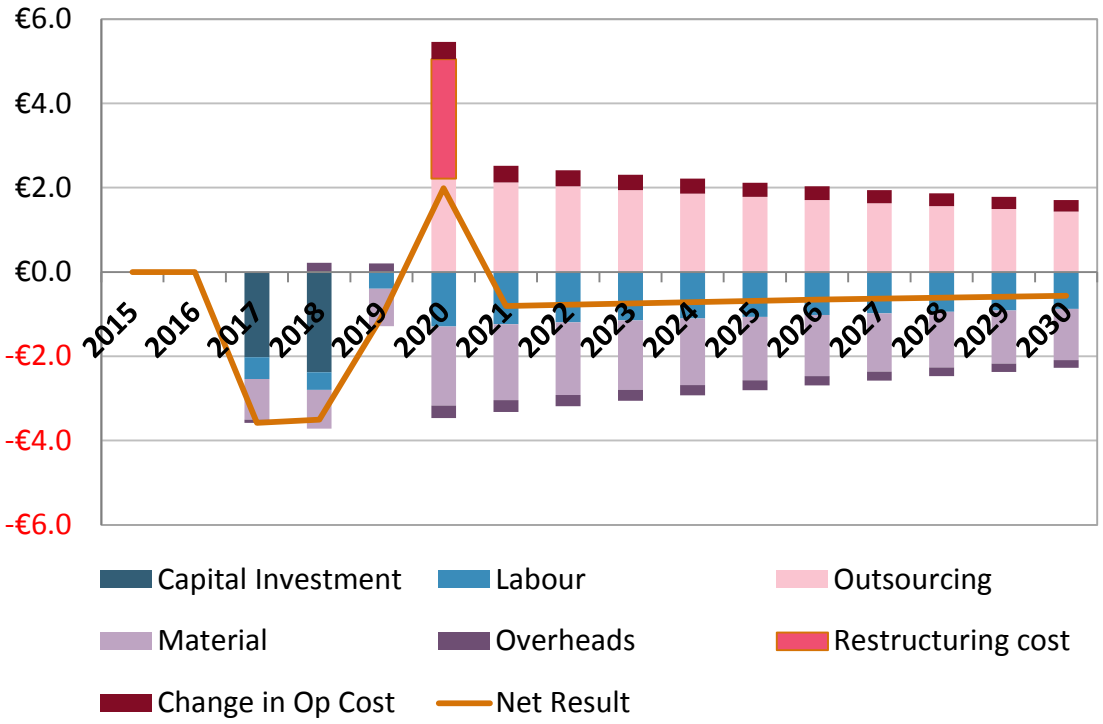
4.75 As a consequence of this loss of work, it was assumed that, in Year 4, Cavan, Dundalk (but not Drogheda), Longford and Sligo garages would close. It was assumed that half the buses (132) would transfer to other garages (a mix of the assumptions under scenarios 2A and 3A) and the remainder would have maintenance outsourced.

Implications

4.76 The analysis indicates that this scenario generates a maintenance cost saving of €1.2m to €1.4m per annum following the removal of the PSO services and consequential depot closures and outsourcing. Looked at on this basis the NPV would appear to be a positive €12.3 million.

4.77 However, it is also necessary to take into account the loss in PSO income. Assuming that this should leave BE no better and no worse off than if it was operating the services, the net position substantially worsens. Restructuring measures intend to adapt to the changes will leave the business with a negative NPV of €1.4 million.

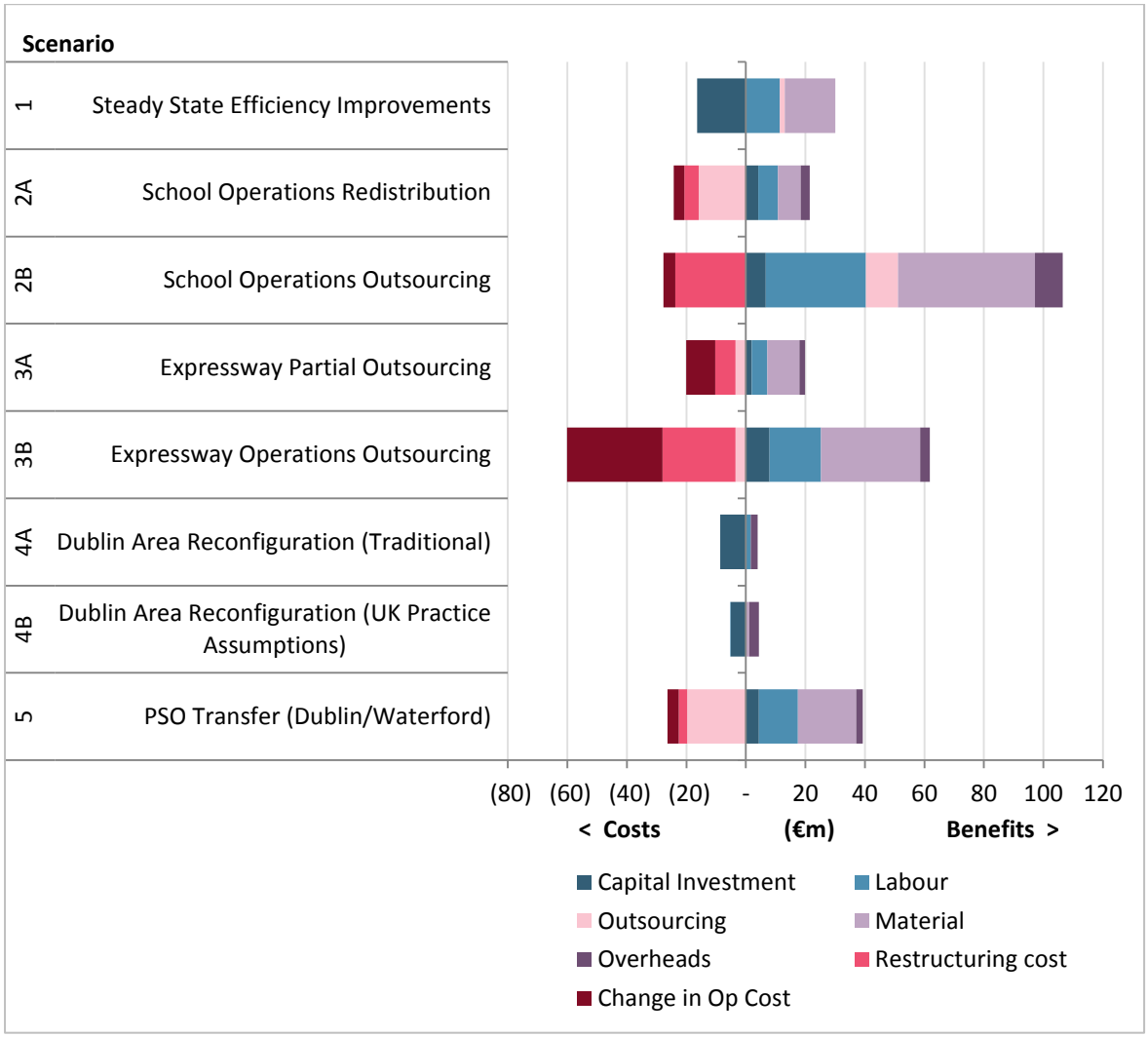
Figure 4.8: Scenario 5 - Summary of net change versus Do Minimum in PV terms



Overall results

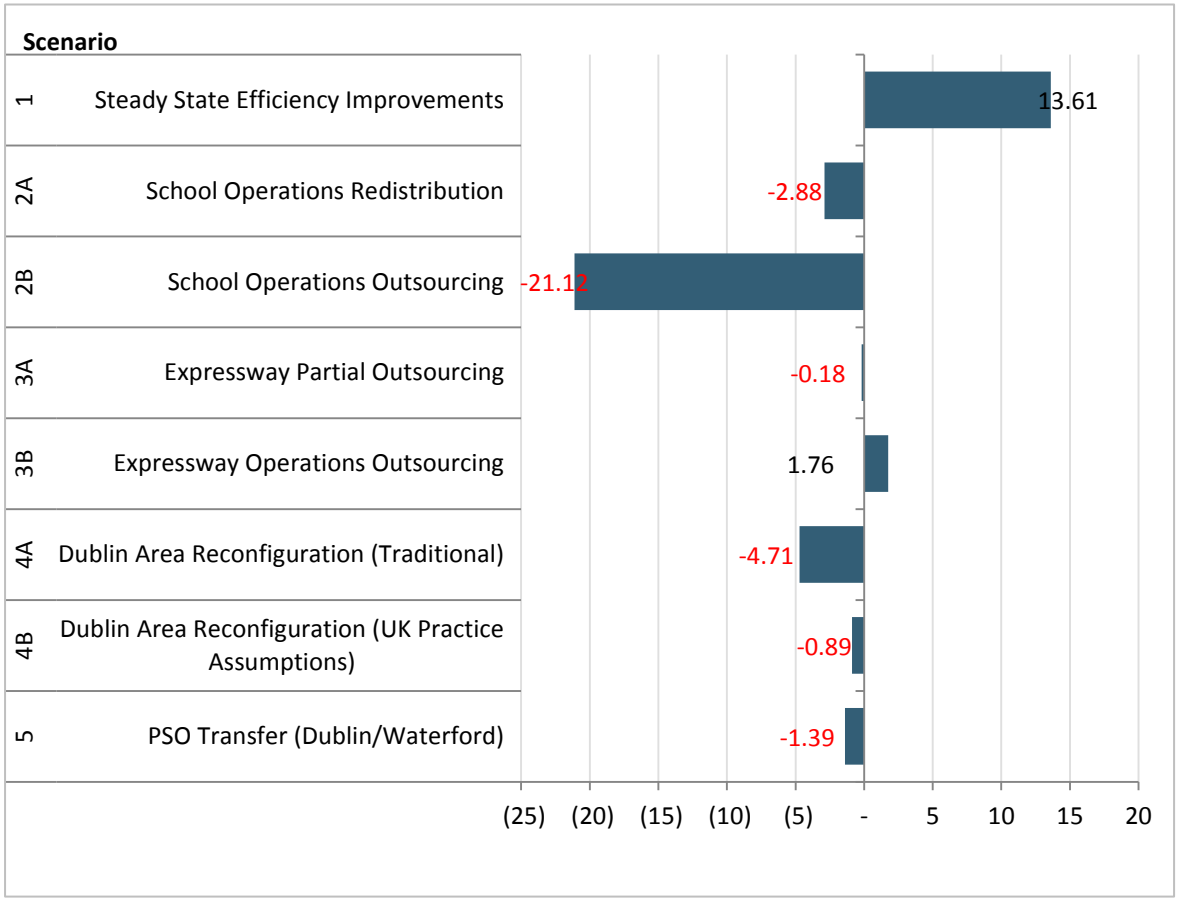
4.78 Figure 4.9 below shows the difference in the 15-year present value for each option and the base.

Figure 4.9: Breakdown of 15-year Present Value change compared with the Do Minimum base case



4.79 As noted in the commentary on individual scenario results the apparent savings associated with Scenarios 2B Schools, and 5 PSO transfers are substantially overstated once the effects of revenue losses are taken into account. The overall net change is presented in Figure 4.10.

Figure 4.10: Overall 15 year NPV of Scenarios relative to Do Minimum base case



5 Methodology for apportioning maintenance costs

Introduction

5.1 In order to make informed decisions on the relative cost effectiveness of maintenance practices and overall financial performance of bus operations it is necessary to have a robust method for apportioning maintenance costs. BE's current maintenance cost allocation methodology (supporting route profitability analysis) dates from 2009. It has been assessed by consultants working for the National Transport Authority and has been considered appropriate. However, the supporting IT systems using SAP are now better and refinements could be made.

5.2 In this section we consider options for how costs can be disaggregated across different parts of the business and review some standard methods for allocating costs in a bus operation.

5.3 The section concludes with some implications for the maintenance department at Bus Éireann.

Principles and options - costing

Overall

5.4 At the company aggregate level, the most basic requirement for costing is to correctly add up all costs incurred by the company so that, when combined with revenue earned, will enable the company to accurately state profits or losses and indicate the levels of taxation due for statutory purposes.

5.5 Bus Éireann also needs to be able to demonstrate that the costs of its PSO contract correctly represent the share of total costs incurred.

Management Information

5.6 Most organisations need more detailed costing information to enable the management of the company to monitor progress of the business. Typically, this will consist of monitoring costs every month/4 weeks as well as disaggregating costs across different parts of the business.

5.7 Management accounts produced for such time periods will show revenues, costs, profit/loss and will usually show variances to budget and comparison with previous years.

5.8 However, for company management to fully understand how the business is performing and to spot emerging trends it is also very useful to be able to report costs on a more disaggregated basis. For a transport company such as Bus Éireann this might include:

- Business sector: Expressway; PSO; Schools.
- Area and/or Depot.

- Route or group of routes.

5.9 The ability to split data at these levels can enable Bus Éireann to effectively monitor and manage its various operations across different factors.

5.10 To give actionable management information it is important that the disaggregation uses a rational methodology for apportioning costs between the activities listed above.

5.11 Where costs vary directly in proportion to the level of activity, it is easy to associate these costs with that activity. However, some costs will be either fixed or associated with elements that do not vary in proportion to the activity being measured.

Cost Allocation for a Typical Bus Operator

5.12 We consider that any cost allocation system needs to be based on records of measureable statistics associated with each of the activities listed in paragraph 4.8 above. These cost drivers should include:

- Kilometres operated;
- Bus hours incurred (including stationary terminal hours if the bus has a driver on board);
- Number of buses required - usually known as the Peak Vehicle Requirement (PVR);
- Not essential, but also of use, is what classification of buses are utilised[3] .

5.13 Direct costs that vary with the level of activity can be allocated to that activity in proportion to one or more of the cost drivers listed above. The table below gives a suggestion as to how various direct costs can be treated as varying by different cost drivers:

Table 5.1: Association between cost drivers and direct cost type

Cost Type	Kilometres	Bus Hours	PVR
Fuel	✓		
Tyres	✓		
Tolls	✓[4]		
Drivers		✓	
Lubricating oil	✓		
Cleaning Labour			✓[5]
Maintenance Labour	See footnote [6]	See footnote [6]	✓[6]
Maintenance Materials	✓		
Vehicle Insurance			✓
Vehicle Licences			✓

[3] This need not be down to individual class type – in fact it is probably better not to disaggregate to that level of detail. Rather it might differentiate standard coach, triaxle, double decker, etc. for example.

[4] Road tolls may be best allocated directly to the relevant activity group, rather than attributing them to a cost driver.

[5] The allocation of cleaning labour to PVR is based on cleaning each vehicle each day at the end of service. Therefore, the number of cleaners at a location would be based on the fleet size based there.

[6] The allocation of maintenance labour to PVR is based on the assumption that maintenance intervals are, in practice, periodically based. However, if maintenance intervals are strictly on a kilometres or hours basis then these cost drivers could be used instead.

5.14 In the case of Bus Éireann there is a mix of periodicity and kilometres with regard to maintenance intervals, suggesting that a more complex driver might be required.

5.15 Most other costs incurred in bus operation are not directly related to the levels of activity and are often considered fixed or indirect costs, although there are advantages to recognising the capital costs of different bus types.

5.16 For some costing purposes it may not be important to allocate the fixed costs to individual activities, but for others it is necessary to be able to allocate them to or split them across to specific activities. It should be noted though, that for most purposes, such an allocation or split inevitably has an element of arbitrariness to it - in particular it may imply a level of potential cost saving, if an activity is reduced or stopped, that, in practice, cannot be fully achieved. In such cases, it is our opinion that the cost change implications of plans are fully assessed to avoid such pitfalls.

5.17 In the case of Bus Éireann it is particularly important to have an agreed split of overhead costs between the Expressway, PSO and School elements of the operations. While for most bus operators simply splitting these costs by PVR is appropriate, in the case of Bus Éireann, Schools buses have only around 60% of the docks of service buses, so an appropriately weighted PVR is likely to make more sense.

5.18 Within the maintenance department, the most valuable use of costing systems is to monitor and compare spending in relation to input/output factors and against budget/forecast. For example, Bus Éireann might be interested in how maintenance costs vary between different categories and types of vehicle, or in the costs of maintenance at different locations.

Allocation of Bus Éireann maintenance costs

5.19 The existing Bus Éireann route profitability system splits maintenance costs by area, separating out Schools (SCH) and Road Passenger Services (RPS), with 'revenue kms' used to allocate costs. Including garage overheads, between different routes.

5.20 Empty movements are ignored, which favours some types of route, such as commuter stage carriage services. We understand that this is under review and would recommend that total mileage is used to produce a more accurate result.

5.21 Future analysis will encompass the actual cost per vehicle, which will be used to separate allocated costs out by SCH and RPS and by bus type (such as SC or VC). However, allocated costs, that is maintenance labour and larger material costs, only make up 50% of the total costs, with 'consumables' and Engineering Operative (EO) labour being allocated pro rata.

5.22 It is recognised that allocation of costs can be too detailed, providing a level of 'accuracy' that can be spurious and potentially misleading, e.g. where buses of a similar type may have significantly different cost, which could lead to one route looking more or less profitable simply by allocating a different fleet. When comparing route level results it would therefore be helpful to conduct a sensitivity test to check the implications of using alternative vehicle types, particularly if withdrawal of an apparently poorly performing route would result in a cascade of buses between routes.

5.23 It should be noted that if certain routes are typically allocated the newest buses, this should be explicitly recognised, with the apportionment of capital costs and fuel also reflecting the specific characteristics of the buses, rather than a fleet-wide average.

5.24 In principle, the existing method should allow the accurate allocation of direct costs across depots and areas. However, we note some areas for consideration:

- Our Data Envelopment Analysis showed that docks were a more accurate measure for comparison than vehicle kilometres. This is because a large number of buses, including all school buses, are maintained on a calendar rather than kilometres run basis.
- However, even this is a simplification as, while docks are an accurate reflection of planned maintenance, distance is probably a better measure of unplanned maintenance, such as work arising or ad-hoc fault repairs.
- Currently, neither in-house labour time, nor materials, are broken down to scheduled maintenance, work arising and ad-hoc repairs. This means that it is not possible to allocate costs by the two different metrics.
- It is our view that if only one method of allocation can be applied, docks are a superior method to vehicle kilometres, based on our DEA work.

5.25 The total number of docks undertaken are closely linked to the size of the fleet (high mileage Expressway coaches excepted). With this in mind, we note that neither the current and nor the proposed Bus Éireann systems take any account of the number of vehicles involved in operating the route. Other than as an incidental effect of different vehicle types being involved; using kilometres as the main cost driver will tend to load costs onto all day city routes, while reducing costs incurred by peak-only services.

5.26 Labour and material costs from external suppliers are not currently split. This means that:

- Bus Éireann cannot directly compare costs of in-house labour with sub-contracting ; and
- Bus Éireann cannot completely establish the maintenance material costs for different types of vehicle.

5.27 If it was desired to allocate labour and materials by different metrics, as noted in 5.13 above, then this lack of detail would be a significant issue. Even as it stands, it raises questions about the allocation of costs at garages where some buses have outsourced maintenance, due to the typically higher price of outsourcing.

5.28 Another issue is whether allocating the “XX” materials and EO labour could be carried out in a better manner. The question is whether the cost of allocating these more accurately would outweigh the benefit. We believe that this could be looked at in two ways:

- Using the 80:20 ‘rule’, could a reasonable proportion of the costs be allocated for a minimal cost; and/or
- If a detailed analysis of the materials was carried out at one location, would it allow for a better allocation than direct relation to currently allocated cost?

5.29 Concerning EO labour, it seems unlikely that it is proportional to either maintenance labour or the allocated materials. Rather it may be related to the number of occasions the bus is brought to the garage, for not only maintenance, but also for refuelling and cleaning. In practice this may be the same (or almost so) as the PVR, which is a readily defined metric.

5.30 There are benefits for logging EO time accurately, not only in terms of quantifying route profitability, but also in the areas of cost planning and control. Bus Éireann will need to determine whether the benefits of change justify the cost. Nevertheless, we believe that there would be benefit in studying whether there is a better method of allocation: it seems possible, for instance, that all RPS buses have similar EO requirements and that PVR may be a better method of allocation to routes.

6 Opportunities to improve efficiency

6.1 SDG was invited to consider additional opportunities to improve engineering efficiency and reduce net costs. The list is illustrative rather than exhaustive, and estimates of potential savings presented in this section are indicative, based on industry benchmarks and professional judgement rather than a detailed analysis. More detailed investigation, beyond the scope of this exercise, would be necessary to support a specific business case.

Whole Life Costing

6.2 Whole Life Costing (WLC) means that all costs related to the purchase and maintenance of an asset over its proposed life are taken into consideration when making decisions about the purchase, use and disposal of buses. This contrasts with a procurement approach which favours lowest tender price for any bus able to meet the initial performance specification.

6.3 Our analysis of the range of maintenance costs across different bus types in the current fleet, suggests that making decisions informed by WLC analysis could have a significant impact on BE's long-term cost base.

6.4 With regard to bus disposal, based on current variances within the various bus classes of similar type and age, we believe that replacing some fleets earlier would save in the region of €5k p.a. per bus. There may also be opportunities for fuel usage savings. Clearly this comes at the cost of higher initial capital outlay, but a policy of targeted replacement should reduce overall cost.

Planning and procurement

6.5 We would recommend making five year plans for the whole Engineering Department and ten year plans around building maintenance and replacement. By planning ahead it should be possible to secure better deals with bus manufacturers - there is a big difference to a manufacturer between securing a one-off, relatively small scale order and establishing an ongoing relationship as a preferred supplier, especially with agreed re-orders. While it is understood that the future availability of capital investment is subject to uncertainty, this should not stand as a barrier to creating a longer term strategy which sets out clear priorities for fleet renewal.

6.6 Combining forward planning with WLC evaluation, a competitive tendering process can be initiated to make sure that BE gets the best value from its fleet replacement programme. To extract full benefit from this process it is vital that the products are suited to the operating environment, maintenance capacity and support network. The ITT specifications and tender evaluation criteria should be designed to address these issues. However, given the evolution of vehicle specifications, and that endemic faults may not materialise for several years the process of WLC remains a guide to choice rather than a guarantee of outturn costs.

6.7 The potential savings are substantial: each 1% drop in the bus replacement programme in 2015 would have been worth €0.5m. Elsewhere it is reported that savings of up to 10% have been achieved.

6.8 A stronger relationship and potential for greater standardisation could lead to advantages in material cost, available technical support and service. A 1% drop in material costs is worth €0.2m a year; making a 5% fall worth €1.0m.

6.9 Major depot expenditure can be anticipated and early decisions made about options, such as reducing size, closing or replacing depots. In particular about whether reactive short term expenditure is justified in light of longer term plans. For instance, in relation to Dublin, planned Broadstone replacement in the medium term would result in changed plans for the short term, which would save upwards of €1m.

6.10 By understanding where demand is likely to increase or decrease, choices can be made to better match allocated resources to future requirements; for example, around depot expenditure, hiring of staff and purchase of equipment.

6.11 There were a number of instances where it appeared that information sharing between Engineering and Operations could be streamlined, to allow problems and constraints faced by both sides to be debated and potential obstacles removed through adopting a consensus based approach. This would facilitate achieving better overall decision making in the interests of the business as a whole.

More intensive use of capital assets

6.12 As is shown in the Broadstone depot replacement comparison (Scenario 4), there are potential benefits from making more intensive use of the capital assets of BE, i.e. the buildings and machinery in the depots. These are largely fixed costs, so the more hours they are in use the lower the average cost of maintenance becomes, even taking into account the premium for additional shift working.

6.13 Capital savings would only be achieved when building new depots or re-building existing ones but, at 30% of the total investment, these are significant. Where future growth leads to capacity constraints, there may also be a case for increased working hours and shift working rather than capital investment.

6.14 In addition, by reducing the net time to complete maintenance, the number of vehicles not available service at any time could be reduced, with a potential reduction in overall fleet size for a given level of output. The extent to which this can be achieved in practice depends on having sufficient volume of maintenance work at any location to fill available capacity, which in turn suggests that a potential way to improve efficiency would be concentrate maintenance activity at fewer depots working longer hours.

Tracking costs and improved management information

6.15 SAP is potentially a very powerful system, but it would appear that BE is not making full use of its functionality to provide actionable management information. For instance, by coding outsourced labour separately from material it would be possible to compare it directly to in-house labour. While labour for other areas is recorded, there is not complete clarity around costs by where the work is carried out, which complicates comparison of efficiency between sites. The former is a minor addition to clerical work at coding time; the latter will require some small changes to SAP reports.

6.16 During the study it was clear that some management information was absent, and what was produced did not always lend itself to understanding underlying issues. One example of this was the apparent over-maintenance of Athlone School Buses indicated by our comparison of docks per bus by depot. Also, the agglomeration of certain depot data also risks losing clarity (e.g. Drogheda being bundled with Dundalk). It is strongly suggested that a review is made of the existing management information in terms of 'fitness for purpose', to ensure that there is adequate data for the Engineering Department to effectively monitor and manage activity levels and associated costs.

6.17 At the moment the costs associated with scheduled maintenance, work arising, ad hoc issues, accidents or failures are not separately identified in the reports. This makes it difficult for management to readily compare relative productivity and identify internal examples of best practice. Given the potential benefits in cost planning and control, we recommend that a working group is set up to investigate how this might be achieved. The benefits are impossible to quantify without carrying out such a study, but this is key in realising the benefits of improved efficiency at the larger depots, which Scenario 1 show could be worth circa €1.4m per annum, a value in line with experience from similar exercises elsewhere.

Opportunities to improve labour efficiency

6.18 All maintenance policies and procedures are determined centrally, but there are some differences in the approach to implementation at a regional level. Although SDG was not tasked to address labour productivity directly, it was clear that there are some obstacles to maximising the efficiency of the workforce:

- Shift patterns: the working patterns differ considerably from depot to depot. There are valid reasons why certain of these differences exist, reflecting the nature of the work and availability of vehicles. However, the wide range is also likely to reflect local custom and practice and some depots will have developed more efficient ways of working than others. It is recommended that further analysis is undertaken to determine what the most efficient ways of working for any given set of conditions, and that these practices are adopted across the company as a standard where possible.
- In addition, it is likely that spare bus numbers could be reduced if working patterns were better aligned to deliver peak vehicle requirements. A reduction of 1% in the spare ratio is roughly a decrease in cost of buses by 0.8%; which would carry through in terms of future capital investment and non-mileage related maintenance expenditure.
- Clerical Staff: there are a number of admin tasks that could be automated, made shorter , or centralised, which would reduce the clerical duties, for instance around payroll and purchasing. There is also a question of whether the current area structure is resulting in some inefficiencies, from duplication of effort. Reducing the workload by 50% would save 11 staff, although up to half the gain would be offset by other costs. It may also be necessary to factor in redundancy payments unless staff could be redeployed.
- Apprentices: BE has been taking on more apprentices than can be employed once qualified. There are some benefits derived from this, such as a pool of skilled labour in the market place, which BE regards it as part of its civic duty. Given that third and fourth year apprentices contribute skilled labour, the net cost to BE seems minimal. However, there is a big difference in capability between a first year apprentice and a fourth year; yet many small depots have only one or two apprentices, meaning that resource will vary from one year to the next, which will affect efficiency. Nor is apprentice time recorded and the time spent on training apprentices is allocated to buses. These practices obscure

the labour hours worked data, and represents an additional barrier to understanding relative efficiency of depots. We therefore recommend that consideration is given to logging productive apprentice hours, but not unproductive training hours by maintenance staff, and by doing the majority of early training at larger depots where they have the resource to cope.

- Staff Terms & Conditions: Although there will be concerns about adverse staff reaction to proposals to revise existing terms and conditions, in any move towards PSO tendering BE will find itself competing for routes against private companies who can benefit more flexible T&Cs in cases where there is no provision for transfer of existing maintenance staff. If BE is unable to compete with equivalent efficiency it will risk the loss of routes which, in turn, could lead to job losses. We would recommend that an exercise is carried out by BE, in order to see what value could be derived from making changes: each 1% improvement in labour efficiency is worth around €160k per annum.

7 Conclusions and recommendations

7.1 In the section below we highlight the key findings from our analysis and make a series of recommendations on the most appropriate approach to future depot maintenance provision and means of improving engineering efficiency. Realising the potential benefits will require a series of strategic decisions affecting investment in fleet and premises, and a commitment to changing working practices to realise potential productivity gains.

Variations in efficiency

7.2 The analysis undertaken has indicated that there is a wide spread in the efficiency of Bus Éireann depots. There is no one underlying factor which can explain the variation, but rather it is a complex combination of circumstances.

Economies of scale

7.3 There appears to be potential for economies of scale at the smaller depots with less than 50 buses. This suggests that there may opportunities for economies from consolidating activity from smaller sites. However, large depots of more than 100 buses tend to show diseconomies of scale.

Variations in costs

7.4 It is notable that certain depots consistently appear in the list of lowest or highest cost to maintain a range of bus types, which suggests that there may be opportunities to learn from best practice. There also appear to be marked differences in the relative cost of maintaining the same type of bus when used for service or for schools, indicating that future school bus cascades would benefit from careful planning.

Inconsistent levels of depot facilities and equipment

7.5 Facilities and available equipment levels vary considerably between depots, with several depots clearly over provided against current needs. Whilst this cannot be changed quickly, it does indicate potential for economies in future rebuilding.

"Steady State" investment needs

7.6 Bus Éireann has undertaken considerable work on analysing the condition of the current premises including a detailed report prepared by the Iarnrod Éireann Structural and Architectural Design Section. The condition of several premises gives serious cause for concern about the ability to support continuing "Steady State" operations without significant investment given their health and safety issues. Some investment is essential if these depots are to continue to be used; although the option of closing certain depots might provide a more economic solution.

7.7 It is notable that Dundalk and Limerick featured prominently as being high priorities for remedial action, and in combination would require investment of €8 million. However, these depots also have notably low efficiency scores which could be influenced by, but are not entirely driven by, the condition of premises.

7.8 In the case of Limerick, there is potential to move operations to the Bus Station when it is re-built, which would lower cost and/or allow more significant reconfiguration of the depot site.

7.9 Due to the size of required capital expenditure, consideration should be given to closure of Dundalk garage as soon as alternative arrangements can be made for maintaining the currently allocated fleet. There would also be scope to look at the future of Cavan and replace the inadequate leased premises at Kells as part of this move. Bringing the outsourced bus maintenance back in house would save circa €500k a year, on top of the reduced overhead from combining three sites into one. Future depot plans also need to recognise growth of commuting to Dublin which will affect medium/long term investment choices.

Evaluating the impact of changes to business and regulatory environment

7.10 To assess potential impacts of a variety of possible changes in the Bus Éireann operating environment, a set of scenarios were agreed with Bus Éireann and subject to financial modelling to assess the impact on maintenance costs, depot investment and vehicle capex requirements. In addition the cost impact of associated restructuring, outsourcing and changes in operating patterns were assessed to give an overall cost benefit assessment. The analysis also took into account broader impacts on the business resulting from a potential fall in revenues associated with the potential transfer of contracts to third parties. 15 year Net Present Values (NPV) were calculated for each scenario, using a 5% discount rate as currently recommended by the Department of Public Expenditure and Reform. This allowed the results of each scenarios to be considered on an equivalent basis.

Schools services

7.11 Two scenarios were tested in relation to the future of schools services. Most locations currently have a mix of school and service operations, although two depots are purely schools and Longford has a single service bus. The first option retained the current scale of direct operations, but redistributed the fleet to concentrate school bus maintenance at fewer depots. There was no business case found for pursuing this strategy, as a consequence of significant restructuring costs to compensate drivers and maintenance staff at locations being scaled down or closed.

7.12 The second option envisaged transfer of all school bus operations to sub-contractors. If Bus Éireann was to take a strategic decision to exit school bus operations, it would need to be in the context of a fundamental review of the whole business model, as most locations have a mixture of schools and service buses. Removing the schools element alone risks making PSO and Expressway more costly, as overheads will be no longer be shared. There would be high restructuring costs leading to a negative NPV.

Expressway

7.13 The future approach to Expressway service provision and a move towards sub-contracting some or all or operations is under consideration. Two scenarios were evaluated as part of this work involving a limited sub-contracting with the concentration of remaining Expressway maintenance at 3 depots, or sub-contracting all Expressway operations by 2020. The first option results in a marginal loss of €0.2 million in NPV, whereas the second would realise

savings of €1.8 million. The case for partial or full contracting of Expressway operations is therefore largely cost neutral from a maintenance perspective.

Future of Broadstone

7.14 Broadstone presents a challenge. The desire to make alternative use of the site means continued use of Broadstone may not be a realistic long term option. Consequently there would be merit in considering relocation to alternative premises in the near term, as an alternative to further, potentially abortive investment in the current, sub-optimal premises.

7.15 Given these circumstances the focus needs to be on finding the most cost-effective alternative. The two options evaluated were a "like for like" replacement based on existing working practices with 18 maintenance bays and a smaller scale replacement, designed for more intensive utilisation (24/7 shift working) with 12 bays. In both cases there should be potential for improvements in working efficiency, but in the second case there would be additional benefits from a potential reduction in the number of spare buses required.

7.16 The "like for like" option yields a negative NPV of €4.7 million. The alternative approach requires lower capital investment saving €3.6 milliion NPV, although these savings are partly offset by higher wage costs from round-the-clock shift working (an increase of €1.9 million). While overall NPV for the second option is still slightly negative at -€0.9 million but may still represent the best long term solution, given uncertainties and potential unforeseen costs to maintain the existing premises and comply with historic building standards. It is therefore recommended that planning for a new depot facility for Dublin services should begin as soon as possible, assuming adoption of efficient working practices.

Impact of PSO competitive tendering

7.17 Should Bus Éireann lose the routes being competitively tendered by the NTA up to 4 maintenance depots could be closed following a redistribution of work and restructuring. This would result in a negative net NPV of €1.4m, assuming that BE is fully compensated for the all costs associated with the operation of the transferred services in Waterford and Dublin, including currently allocated overheads.

Scope for efficiency improvements

7.18 The analysis demonstrates that there is significant potential for improved efficiency and cost savings to be realised by increasing the efficiency of all depots up to the current best levels achieved by Bus Éireann. Bus Éireann would be make further improvements to its cost effectiveness of maintenance if there was a policy of consistent additional fleet investment of €2.5m per annum over the next ten years to reduce the average age to 7 years, remove poorly performing or unsuitable bus types and achieve greater fleet standardisation.

7.19 This scenario delivers savings which rise year on year in real terms, and a positive NPV of €13.6m. The ability to deliver this level of improvements may be constrained in practice by the economic environment, in particular the availability of capital to update the bus fleet or make depot improvements.

Fleet renewal strategy

7.20 Fleet renewal is a key part of maximising depot maintenance efficiency gains but it is vital that the products being procured are suited to the operating environment, maintenance capacity and support network. Adopting a Whole Life Costing (WLC) approach to the evaluation of bids would help to ensure that all potential costs related to the purchase and maintenance of an

asset over its proposed life are taken into consideration when making decisions about the purchase, use and disposal of buses.

Improved labour efficiency and productivity

7.21 While all maintenance policies and procedures are determined centrally, there are some differences in the approach to implementation at a regional level. Working patterns differ considerably from depot to depot. There are valid reasons why certain of these differences exist, reflecting the nature of the work and availability of vehicles. However, the wide range is also likely to reflect local custom and practice and some depots will have developed more efficient ways of working than others.

7.22 The workforce composition is not consistent across depots. Levels of overtime working are surprisingly varied and do not seem to directly relate to depot size or levels of absence. Overtime per se is not necessarily a bad thing, but the current patterns suggest that it is driven more by local custom and practice than planned optimisation.

7.23 Increased levels of shift working would enable more productive use of depot equipment and a requirement for lower levels of capital investment at new or re-constructed depots. It may also offer scope for a reduction in the number of spare vehicles.

7.24 It is recognised that there may be industrial relations challenges associated with changes to working practices needed to deliver greater labour efficiency, but our analysis demonstrates that efforts to reform have potential to yield significant financial benefits.

Realising efficiency gains: management information

7.25 Realising efficiency gains depends on access to clear and accurate management information to readily compare relative productivity and identify internal examples of best practice. it was clear that some essential management information is currently absent, and what was produced did not always lend itself to understanding underlying issues. The costs associated with scheduled maintenance, work arising, ad hoc issues, accidents or failures are not separately identified in current management reports.

7.26 Existing management information should be reviewed in terms of 'fitness for purpose', to ensure that there is adequate data to effectively monitor and manage activity levels and associated costs. Given the potential benefits in cost planning and control, we recommend that a working group is set up to investigate how this might be achieved.

steer davies gleave

Appendix

A Data sources

A1.1 Data received for Data Envelopment Analysis

- Number of vehicles by type and age;
- Operational kilometres by vehicle type;
- Operational kilometres by service type, e.g. schools, expressway (or by each route if easier), but split only by schools and 'service';
- Materials by location and vehicle type, but not allocated to specific exams;
- Third party contractor costs by vehicle type and category of 'exam' (and method of allocation);
- Labour costs by location and vehicle type, but not allocated to specific exams;
- Labour hours split between staff type/grade with average wage cost per type/grade (to allow us to agree back to labour costs);
- Cost breakdown of facilities at each location, e.g. rents, utility costs, building and plant maintenance;
- Ownership of premises, their approximate age and condition;
- What facilities are installed, their approximate age and condition;
- Whether any external maintenance is carried out by in-house staff (*there is none*);
- Whether any other party makes use of the premises (*no*);
- What categories of exam are carried out at the location; and
- Map showing all the garages.

Missing or unavailable:

- "Dead" kilometres data;
- Mean Distance Between Failure for each vehicle type (or similar measure); we have had some indication of reliability from VOR reports instead;
- Maps showing routes and 'outstations' for each garage.
- The missing data did not prevent SDG running DEA for various settings.

A1.2 Data received for Depot investment option analysis

- Buses that ran the routes during 2015 that are to be competitively tendered;
- Addresses (locatable on Google Maps) where school buses are parked overnight;
- Details of school bus maintenance by garage;
- Which Expressway buses are proposed to be contracted out;
- School bus fleets by depot back to 2007;
- Work for other depots ;
- Details of proposed capital works, including general description of works; and
- Fuel costs per km.

A1.3 Data and assumptions received for assessment of operational impact and restructuring costs

- PSO operating costs per bus-km:
  - Marginal – drivers and fuel only
  - Direct costs excluding maintenance
- PSO transfer of Waterford and part Dublin operations
  - Assume that negotiated net position is cost neutral after transfer, adjusting for loss of revenue and reduced operating costs whilst ensuring allocated overheads remain fully covered

- Expressway operating costs per bus-km
  - Marginal – drivers and fuel only
  - Direct costs excluding maintenance
  - Direct costs including maintenance
  - Direct costs including maintenance plus area overheads
  - Full costs including all overheads
  - Contractor full cost including 15% profit margin
- Expressway directly operated kms by route
- Expressway driver numbers by route

- School transport scheme restructuring costs
  - Drivers voluntary severance and ex-gratia payments
  - Maintenance staff voluntary severance payments
  - Contingency
  - Allowance for natural retirement over 0, 5, 10 years

SDG used agreed and benchmarked assumptions where data was not directly available.

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