IPART REVIEW OF PRIVATE FERRIES

FINAL REPORT

Prepared for IPART

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1 EXECUTIVE SUMMARY

1.1 Context

As part of its regulatory responsibilities, IPART undertakes a review of maximum fares for the private ferry industry every four years. To inform IPART's fare review, Indec has assessed the efficiency of operators reported operating and capital costs for the review period 2022-2025.

The efficiency of operators' reported costs was assessed by reference to costs models, cost benchmarks from previous reviews of the industry and by examining annual changes in costs. It is important to note the private ferry industry is a small-scale industry, often operated by family owned businesses and is extremely heterogeneous in nature with different service routes, business structures and patronage characteristics. Due to these industry characteristics, it is not possible to definitively determine whether an operator is efficient. Rather we consider whether operators are reasonably efficient.

CIE previously determined cost benchmarks for total operating cost, labour cost, repairs and maintenance, insurance, mooring and other operating costs per service hour for the private ferry industry. The 2022-2025 Cost Review uses an independent cost model to determine industry labour and fuel costs benchmarks, in addition to the cost benchmarks used previously for other cost categories (updated to 2021 year dollars). A summary of the benchmarked used in the report are contained in Table 1-1.

Table 1-1 Cost Categories

Cost Category	CEI 2018-2021 Cost Review	Indec 2022-2025 Cost Review
Labour Cost	Benchmark $/hr (engine hour)	Cost Model
Fuel Cost	Benchmark $/hr (engine hour)	Cost Model
Repairs and Maintenance	Benchmark $/hr (engine hour)	Benchmark $/hr (engine hour)
Insurance	Benchmark $/hr (engine hour)	Benchmark $/h (engine hour)r
Mooring	Benchmark $/hr (engine hour)	Benchmark $/h (engine hour)r
Other Costs	Benchmark $/hr (engine hour)	Benchmark $/h(engine hour)r

1.2 Operating Cost Findings

Based on information prepared by Ferry Operators, the 2022-25 Cost Review considers actual reported costs to be reasonably efficient if they are within 10% of the cost benchmark, or with $10,000 for lower value cost categories. The review found:

- Cronulla Ferries, Church Point Ferry Service, Palm Beach Mackerel and Ettalong (NRMA), and Brooklyn Ferry Service costs are within the total cost benchmarks and are considered reasonably efficient
- Clarence River, Lane Cove (Captain Cook) and Central Cost Ferries did not submit costs to IPART so no assessment is made

A summary of the analysis results are contained in Table 1-2.

Table 1-2 Actual vs Benchmark Cost Position

Operating Cost Item	Brooklyn Ferry Service	Captain Cook Ferries	Central Coast Ferries	Church Point Ferry Service	Clarence River Ferries	Cronulla Ferries	Palm Beach Ettalong*	Palm Beach Mackerel *
Labour	Below			Within		Within	Within	Below
Fuel	Above			Within		Below	Within	Within
Repairs and Maintenance	Above			Below		Above	Above	Above
Insurance	Above			Above		Within	Within	Within
Mooring	Above			Within		Within	Within	Within
Other Costs	Above			Below		Above	Above	Within
Total	Within			Within		Within	Within	Within

1.3 Capital Cost Findings

In a departure from previous Cost Reviews, 2022-2025 Cost Review identifies the Whole of Life (WoL) capital maintenance costs required over the economic life of the vessel fleet to estimate the annual average maintenance expenditure. The approach addresses previous issues with major capital upgrades falling outside of the four-year review cycle (resulting in lumpy expenditure profiles), and the difficulty confirming if previous review period allocations had been spent.

The annual estimates are no longer a direct comparison to the costs nominated by Operators, which are based on actual maintenance cycles. The Cost Review therefore does not assess the efficiency of costs nominated by the operator. A comparison is included in the report for information only.

A summary of the forecast average annual maintenance expenditure for each operator is contained in Table 1-3.

Table 1-3 Forecast Whole of Life (WoL) Capital Maintenance Costs

Operator	Economic Life	Ave Annual WoL Cost
Brooklyn Ferry Service	25	$18,013
Captain Cook Ferries	25	$15,580
Central Coast Ferries	25	$18,013
Church Point Ferry Service	25	$22,413
Clarence River Ferries	25	$17,780
Cronulla Ferries	25	$27,900
Palm Beach Ettalong*	15	$90,667
Palm Beach Mackerel*	25	$19,100

In relation to vessel replacement capital expenditure, the 2022-2025 Cost Review does not assess the efficiency of capital allocations nominated by operators. Instead, the Review specifies the Modern Equivalent Function (MEF) vessel replacement cost for each operator based on their existing fleet.

2 INTRODUCTION

2.1 Private Ferry Regulation

The 2022-2025 Efficient Cost Review (the Cost Review) provides an assessment of the operating costs and capital expenditure for private ferry operators in NSW. Currently seven operators provide private ferry services for the public (broadly made up by students, commuters, local residents and tourists). These operators are typically 'small businesses' that often have close ties with their local communities. The ferry services covered by this review are listed in Table 2-1.

Table 2-1 Private Ferry Operators

Operator	Routes
Brooklyn Ferry Service	Brooklyn to Dangar Island
Central Coast Ferries	Woy Woy to Empire Bay
Church Point Ferry Service	Scotland island - morning Bay
Clarence River Ferries	Iluka to Yamba
Cronulla and National Park Ferry Service	Cronulla to Bundeena
Palm Beach Ferry Service	Palm Beach to Mackerel Beach and Basin Palm Beach to Ettalong and Wagstaff
Captain Cook Cruises – Lane Cove Ferry	Lane Cove Darling Harbour

2.2 IPART's role in regulation of private ferry services

IPART is responsible for regulatory reviews of maximum fares for private ferry services in NSW. IPART's reviews are undertaken on four year rolling cycle in accordance with the Tribunal's regulatory framework for monopoly service providers.

This review will determine maximum fares ferry operators are permitted to charge over the four-year period 1 January 2022 to 31 December 2025. It considers two broad cost categories incurred by operators in delivering ferry services:

- Operating costs (expenditure) including labour, fuel, maintenance, licensing etc. but excluding financial charges
- Capital expenditure including new fleet and major capital renewals (engine replacement, cabin refurbishment etc.)

2.3 Operator submissions to the review

All operators of ferry services subject to the Cost Review were requested by IPART to submit a maximum fare proposal, forecast ticket sales, and operating and capital expenditure forecasts over the upcoming review period. IPART provides a standard template for operators to use that ensures full coverage of the main cost items covered by the review and ensures consistency between operators.

In addition to operating expenses, operators are asked to nominate their capital investment intentions covering major periodic maintenance (engine works and refurbishments) and vessel replacement.

As was the case with previous reviews, not all operators provided a complete dataset for the review. A summary of information provided to the review is contained in Table 2-2.

Table 2-2 Operator reported data

Service	2021-24 Data	2021 Only	No Data
Brooklyn Ferry Service		✓	
Captain Cook Ferries			✓
Central Coast Ferries			✓
Church Point Ferry Service	✓		
Clarence River Ferries			✓
Cronulla Ferries	✓		
Palm Beach Ettalong*	✓		
Palm Beach Mackerel*	✓		

* operated by NRMA

2.4 Past Reviews (Indec and CIE)

2.4.1 Indec's 2014 and CIE's 2018 review

Operating Costs

Indec was previously commissioned by IPART to estimate the efficient costs of providing private ferry services for the 2014 to 2017 fare reviews. With regards to operating expenditure, Indec reported:

- for the 2014 review that current operating costs exceeded reasonably efficient costs for one out of six private ferry services reviewed
- for the 2015 review that current operating costs exceeded reasonably efficient costs for three of the four private ferry services reviewed

CIE was commissioned by IPART to estimate the efficient costs of private ferry services for the 2018-2021 period. Table 2-3 below summarises their findings.

Table 2-3 Summary 2018 findings (CIE)

Operating Cost Item	Brooklyn	Church Point	Cronulla	Palm Beach Mackerel	Palm Beach Ettalong	Captain Cook	Clarence River (Clarence)	Central Coast
Labour	Below	Below	Equal	Above	Above	N/A	N/A	N/A
Fuel	All operators' reported fuel costs deemed reasonably efficient							
R&M	Above	Above	Above	Above	Below	N/A	N/A	N/A
Insurance	All operators' reported insurance costs deemed reasonably efficient							
Mooring	All operators' reported insurance costs deemed reasonably efficient							
Other operating costs	Above	Below	Above	Above	Above	N/A	N/A	N/A
Total Operating Costs	Below	Below	Above	Above	Above	N/A	N/A	N/A

Key findings from CIE's 2018 assessment with regards to total operating costs were:

- Brooklyn's total operating costs were below the cost benchmark
- Church Point's total operating costs were below the cost benchmark
- Total operating cost for Cronulla and both Palm Beach ferry services exceeded the cost benchmark

Capital Costs

CIE assessed the efficient capital expenditure for ferry replacement for the years between 2018 and 2021. The CIE Review assumed a useful economic life of vessels as 25 years for slow ferries and 15 years for fast ferries, noting the "useful life" of a ferry can be extended well beyond the assumed "economic life" if the vessel is well maintained.

2.5 Summary of Indec's 2021 approach to assessing efficient costs

Indec has been commissioned by IPART to assess whether private ferry operators' costs for the review period of 2022 – 2025 are efficient. The assessment is based on the following methodologies:

- Bottom-up cost estimate where it is feasible to model future operator costs
- Comparison against cost benchmarks
  - Across operators
  - Historic

A description of the methodology used for each cost category assessed in contained in

Table 2-4.

Table 2-4 Cost Assessment Methodologies

Cost component	Indec's approach
Operating Costs	
Labour	Bottom-up cost build up for crewing labour
Fuel	Bottom-up cost based on fuel consumption estimates
Berthing and mooring	Benchmarked against previous studies (CIE, Indec)
Insurance	Benchmarked against previous studies (CIE, Indec)
Repairs and maintenance	Benchmarked against previous studies (CIE, Indec)
All others	Benchmarked against previous studies (CIE, Indec)
Capital Costs	
Major Periodic Maintenance	Benchmarked against efficient capex profile using estimates on engine replacements, engine rebuilds, refurbishments
New Vessel Capital Expenditure	Assessed against MEF replacement cost

Operators are requested to provide 2021 "actual" data for each of the cost categories. This is used by all operators as the basis for forecasting the future operating cost expenditure over the four (4) year review period between 2022-2025.

3 OPERATING COSTS

The annual operating costs incurred by each operator are influenced by a range of factors specific to the services provided. These include the local operating environment, route and timetabling, and the type of ferry fleet deployed. The review therefore examines operating costs at a disaggregated level to better understand and account for operator specific costs.

The 2022-25 Cost Review adopts the same operating cost categories used in the 2014 to 2017 Indec Cost Reviews and 2018-21 CIE Cost Review. The cost categories are listed below.

- Labour — wages, workers compensation, payroll tax and superannuation for all permanent full-time and part-time staff and any casual employees employed directly by the operator
- Fuel — include the cost of fuel in relation to the provision of regulated ferry passenger services
- Repairs and maintenance— should only include parts and consumable costs relating to the repair and maintenance of ferries, e.g. internal and contracted ferry maintenance.
- Insurance — should include all insurance premium expenses other than ferry insurance, e.g. public liability.
- Mooring — the annual rent paid for mooring/berths in relation to the provision of ferry passenger services.
- Other — includes all other operational costs that aren't accounted for in the above categories, e.g. cash collection costs, office rent, communication costs, financial services, external consultants, advertising, consumables and uniforms.

3.1 Operator services and classification

Ferry operators deploy a range of vessel types to deliver services that demonstrate different operational cost profiles. To account for this, cost benchmarks used in the Cost Review have been classified based on the size and speed of each operator's fleet.

The classifications used in the review for each operator are shown in Table 3-1.

Table 3-1 Operator Classification

Classification	Operators
Fast Ferry	Palm Beach - Ettalong
Slow Large (>100 capacity)	Cronulla – Bundeena, Clarence River, Palm Beach – Mackerel, Captain Cook (Lane Cove)
Slow Small (<100 capacity)	Brooklyn – Dangar, Church Point, Central Coast

The Cost Review classifies each operator based on the "primary" vessel deployed to perform the contracted services. It is noted that individual operators may utilise a fleet-based strategy where a combination of vessels are used to deliver a single service. In this case, the classification is based on the most highly utilised vessel used by the operator.

3.2 Labour costs

Labour costs are provided by operators at an aggregate level with no breakdown by labour type. As a result, the reported labour costs include front-line crewing costs and back-of-house costs such as management and administration. To assess the efficiency of costs, the Cost Review has independently modelled as estimate of the efficient operating costs based on fleet and service specifications.

The efficient estimated total labour cost has been compared with the actual costs reported by operators for 2021. The review found:

- Reported total labour cost varies between $200/hr and $50/hr across the operators
- Brooklyn Ferry Service, Church Point Ferry Service, Cronulla Ferries, Palm Beach Ettalong and Palm Beach Mackerel labour costs are considered reasonably efficient
- Captain Cook Ferries, Central Coast Ferries and Clarence River Ferries did not submit actual costs

3.3 Fuel costs

An estimate of fuel consumption rates has been calculated based on historic operator data to assess the efficiency of reported fuel costs. Factors that influence a vessel's total fuel costs include the annual service kms, vessel size, engine type, travel speed, stopping pattern and dead running.

The estimated 2021 annual fuel cost for each operator has been calculated based on the annual service kms and an allowance for dead running. The review found:

- Reported fuel costs ranged between $9/hr and $93/hr across the operators. For slow ferries only, the fuel costs ranged between $9/hr and $18/hr
- Church Point Ferry Service, Cronulla Ferries, Palm Beach Ettalong and Palm Beach Mackerel fuel costs are considered reasonably efficient
- Brooklyn Ferry Services actual fuel costs are not assessed as reasonably efficient
- Captain Cook Ferries, Central Coast Ferries and Clarence River Ferries did not submit actual costs

3.4 Repairs and maintenance

The CIE 2017 Review reported a reasonable and efficient repairs and maintenance cost of $9.70 per service hour for slow ferry services and $24.20 per service hour for fast ferry services, equivalent to approximately $10.70 and $26.70 per service hour in 2021 dollars, respectively.

In the 2017 review, the repairs and maintenance cost per service hour benchmark was adjusted by a factor of 1.5 for 'slow' ferry services with vessel capacity greater than 100 passengers. The adjustment was made on the assumption that repairs and maintenance costs for vessels with capacity greater than 100 are greater than vessels with capacity less than 100 passengers. This assumption has been carried forward in this review to reflect the additional parts and equipment that need to be maintained and the additional stresses encountered by larger vessels. The review found:

- Reported repairs and maintenance costs ranged between $9/hr and $34/hr across the operator.
- Church Point Ferry Service repairs and maintenance costs are considered reasonably efficient
- Brooklyn Ferry Service, Cronulla Ferries, Palm Beach Ettalong and Palm Beach Mackerel repairs and maintenance costs are not considered reasonably efficient
- Captain Cook Ferries, Central Coast Ferries and Clarence River Ferries did not submit actual costs

3.5 Insurance costs

Reported insurance costs vary significantly between operators. As noted by Indec in the 2014 Cost Review, insurance costs are dependent on claims history, and the size and age of the ferry and can vary significantly across operators. An average insurance cost of $4/hr has been adopted for each vessel in the operator's fleet. The review found:

- Reported insurance costs ranged between $7/hr and $17/hr across the operators
- Cronulla Ferries, Palm Beach Ettalong and Palm Beach Mackerel insurance costs are considered reasonably efficient
- Brooklyn Ferry Service and Church Point Ferry Service insurance costs are not considered reasonably efficient
- Captain Cook Ferries, Central Coast Ferries and Clarence River Ferries did not submit actual costs

3.6 Mooring costs

Mooring fees incurred by operators relate to overnight berthing and mooring of ferries, not for the use of wharves for regulated services. As a result, mooring costs per service hour range substantially across operators depending on their individual circumstances.

This Cost Review has adopted an average mooring cost of $3/hr for 2021 noting there will be significant variations from this figure across operators. The review found:

- Reported mooring costs ranged between $1/hr and $10/hr across the operators
- Cronulla Ferries, Church Point Ferry Service, Palm Beach Ettalong and Palm Beach Mackerel mooring costs are considered reasonably efficient
- Brooklyn Ferry Service mooring costs are not considered reasonably efficient
- Captain Cook Ferries, Central Coast Ferries and Clarence River Ferries did not submit actual costs

3.7 Other operating costs

Other operating costs incurred by operators include sundry items such as office rent, cash collection, information technology, electricity, professional fees and motor vehicle expenses. Several operators have captured the cost of replacement bus services within this cost category.

Several cost categories reported by services providers such as depreciation, interest and fleet lease costs have been excluded from the review.

In its 2014 study, Indec1 estimated a reasonable and efficient 'other operating' cost per service hour of $10.90 per service hour, equivalent to $13.0 per service hour in 2021 dollars. The review found:

- Reported other costs ranged between $7/hr and $37/hr across the operators
- Church Point Ferry Service and Palm Beach Mackerel other costs are considered reasonably efficient
- Brooklyn Ferry Service, Cronulla Ferries, Palm Beach Ettalong other costs are not considered reasonably efficient
- Captain Cook Ferries, Central Coast Ferries and Clarence River Ferries did not submit actual costs

[1] Indec 2014, Efficient costs of providing private and Newcastle-Stockton ferry services, Prepared for IPART 2014.

3.8 Total Operating Costs

Total operating costs benchmarks for each ferry operator have been developed by aggregating each of the individual cost categories. Total cost benchmarks range between $140/hr and $445/hr for the different operators and service requirements. The Review found:

- Cronulla Ferries, Brooklyn Ferry Services, Church Point Ferry Service, Palm Beach Ettalong and Palm Beach Mackerel total costs are considered reasonably efficient
- Captain Cook Ferries, Central Coast Ferries and Clarence River Ferries did not submit actual costs

4 CAPITAL EXPENDITURE

4.1 Approach to Validating Capital Expenditures

The Cost Review takes a simplified approach to assessing efficient capital expenditure by forecasting the whole-of-life (WoL) cost of an "equivalent" service provider delivering the contracted services. The WoL cost is converted to an annuity (yearly) payment to determine the funding level for each four (4) review period. Unlike past reviews, no attempt is made to validate the efficiency of the capital expenditure profiles nominated by each operator, as all vessel purchase and renewal maintenance capital expenditure is captured within the annuity payment.

Capital maintenance costs considered in the Cost Review include engine replacements and refurbishments and general overhauls. The WoL capital expenditure forecasts are determined independently based on standard maintenance and replacement intervals and benchmark costs for an equivalent vessel performing the same services.

The timing of fleet replacement capital expenditure is even more acute given these costs represent such a significant outlay for most operators. As described in the previous section, the difficulty in forecasting future new fleet expenditure leads to significant distortions in the RAB and consequently the fare settings.

Again, to address this requirement, the review identifies the Modern Equivalent Function (MEF) replacement cost of each operators' fleet required to deliver the contracted services.

4.1.1 Benchmark Cost Categories and Service Intervals

The major capital expenditure items related to the asset management and replacement of vessels include:

- Ferry acquisition costs
- Spare parts (ferries)
- Safety equipment
- Engine rebuilds and mid-life overhaul expense
- Structural repairs and refurbishment of the vessel's hull and coach house, and on-board services (electrical systems, etc.)
- Refit of cabin interiors

The efficient cost and timing of major capital investments have been developed based on previous reviews and feedback provided by operators. In the 2017 Cost Review, CIE carried forward the assumptions used by Indec in the 2014 Efficient Cost Review. The costs have been escalated to reflect current year costs.

4.1.2 Economic Life of Vessels

Capital allowances for vessel replacement will generally be considered appropriate when the existing vessel/s reached or exceed a pre-defined life expectancy. Nominated replacement costs are validated against the Modern Equivalent Function (MEF) replacement costs considering the vessel capacity and speed (fast or slow).

The assumptions used in the Review are listed below.

- Fast Ferry – 15 years
- Slow Ferry – 25 years

The useful economic life for other asset classes has been assessed as:

- Engine rebuilds occur at 10 000 hours

- Engine replacements occur at 20 000 hours
- General refurbishments occur every 3 years

The benchmark costs used in the Review for major periodic maintenance items are shown in Table 4-1.

Table 4-1 Capital Maintenance Benchmark Costs (2021)

Vessel Categorisation	Engine Rebuild	Engine Replacement	General Refurbishment
Fast Ferry	$50,000	$90,000	$110,000
Slow Ferry -	$22,000	$33,000	$25,000 (small) $37,500 (large)

In accordance with the approach adopted in the 2017 review, a factor of 1.5 has been applied to the General Refurbishment costs for vessels with a capacity of over 100.

4.2 Capital Maintenance Allowance

Capital expenditure requirements for an equivalent operator have been prepared using established cost benchmarks, assumed economic lives and major periodic maintenance interval cycles.

For major capital maintenance works including engine and general refurbishments, to reduce the variability across cost review cycles whole-of-life costs have been calculated based on the assumed economic life of the asset. This has been averaged to determine an average annual cost (real). The estimated annual and total cost over the review period are shown in Table 4-2.

Table 4-2 Estimated Capital Maintenance Costs for Equivalent Operator

Operator	Economic Life	Ave Annual WoL Cost
Brooklyn Ferry Service	25	$18,013
Captain Cook Ferries	25	$15,580
Central Coast Ferries	25	$18,013
Church Point Ferry Service	25	$22,413
Clarence River Ferries	25	$17,780
Cronulla Ferries	25	$27,900
Palm Beach Ettalong*	15	$90,667
Palm Beach Mackerel*	25	$19,100

4.3 Vessel Replacement Capital Allowance

In past cost reviews, an attempt was made to validate vessel replacement capital nominated by operators on the basis of fleet age. The 2022-25 Cost Review specifies the MEF vessel replacement cost for each

operator which will be amortised over the life of the asset and returned to the operator as an annuity payment. This approach would bundle all future vessel capital expenditure and WoL capital maintenance costs within a single annuity payment paid each year to operators.

The MEF replacement values used to determine the “vessel replacement capital component” of the annual capital allowance is outlined in Table 4-3.

Table 4-3 MEF Vessel Replacement Costs

Vessel Size (slow only)	MEF Replacement Cost ($2021)
40	$986,609
50	$1,040,100
60	$1,093,591
70	$1,141,138
80	$1,188,686
90	$1,236,233
100	$1,283,781
110	$1,337,271
120	$1,390,762
130	$1,438,310
140	$1,485,857
150	$1,533,405
160	$1,580,952
170	$1,634,443
180	$1,676,047
Fast Ferry (large)	$4,100,000

4.4 Future Transition to Electric Vessel Fleet

A number of private ferry operators have indicated they would seek to transition to an electric vessel fleet once their current fleet reaches the end of its economic life. With many operators currently utilising an aging fleet, this possibility is likely to be experienced within the duration of this review period.

Under the current contract arrangements for private ferry operations, there are no existing provisions or requirement that would force operators to make the transition to an electric vessel fleet. However, TfNSW has recently published its emissions strategy for 2030 and has placed the requirement to operate a “low emission fleet” on its retendering of the Manly Fast Ferry and Lane Cove Ferry Services.

Given the long economic life of vessels, there is a risk to operators that if they renew their fleets with internal combustion engine (ICE) vessels they may not be compliant with future emissions requirements - even allowing for a reasonable transition period. From an efficiency perspective, this would be an inefficient outcome given the need to turn over vessels mid operating life.

It is currently argued by operators the higher electric vessel capital cost relative to diesel internal combustion engine (ICE) vessels presents an impediment to investment under the current pricing model. Operators would also be required to make significant investment in charging infrastructure to support electric vessel operations.

Reliable information on the initial capital costs and long-term operating and maintenance costs of electric vessels is not readily available to validate the operator's position. However, similar patterns to those experienced in the bus sector could reasonably be expected to present given the similarity in operating conditions and requirements.

As such, Indec has developed a comparative cost profile to assess the expected whole of life cost differential between electric and ICE vessels. This information is based on source data from the bus sector that has been modified to align with the primary private ferry operating cost categories. As such, the costs are indicative of broad sector trends only and should interpreted from a strategic perspective.

Table 4-4 contains indexed costs for each of the major whole of life costs for alternative transition years. Each of the costs shown have been indexed against the 2022 capital cost of an ICE vehicle.

Table 4-4 Whole of Life Index Prices based on year of adoption (no cost escalation)[2]

Component	ICE Baseline	2030 Switch to Full Electric Fleet	2040 Switch to Full Electric Fleet
Vessel Capital	**100**	159	122
Charging Infrastructure	-	10	8
Fuel	80	52	52
General Maintenance (incl capital)	107	75	75
Mid-Life Overhaul	-	36	29
Total	**287**	**332**	**286**

The results indicate that capital costs of electric vehicles will continue to exceed the equivalent ICE vehicle cost beyond 2040, although there is a strong downward trend by this time. The additional capital costs are offset by lower fuel and general maintenance expenses, although electric vehicles require a significant mid-life overhaul (battery replacement) that offsets some of the general maintenance savings.

Whole of life cost parity is expected to be reached sometime shortly before 2040. This is sometime after parity is forecast to be reached for private road vehicles owing to the lower investment in the development of mass transit vehicles and the additional infrastructure costs required to operate a fleet.

[2] Indec analysis

4.5 Electric Fleet Way Forward

The above results indicate it will not be commercially viable for most operators to switch to electrical vessels based on the existing efficient cost assessment approach adopted in this report until around 2040 when price parity is achieved.

Given it is unlikely regulations or future contract provisions would permit the operation of ICE vessels indefinitely, this presents a risk that operators will be forced to invest in ICE vessels to operate within the current efficient cost parameters and take the risk they may be left with stranded assets if regulations or contract provisions change.

Given this will ultimately deliver an inefficient outcome, it is recommended TfNSW engage with operators to investigate appropriateness of a bridging payment to offset the additional cost operators may incur above the efficient ICE cost prior to whole of life costs for electric vessels reaching parity.

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