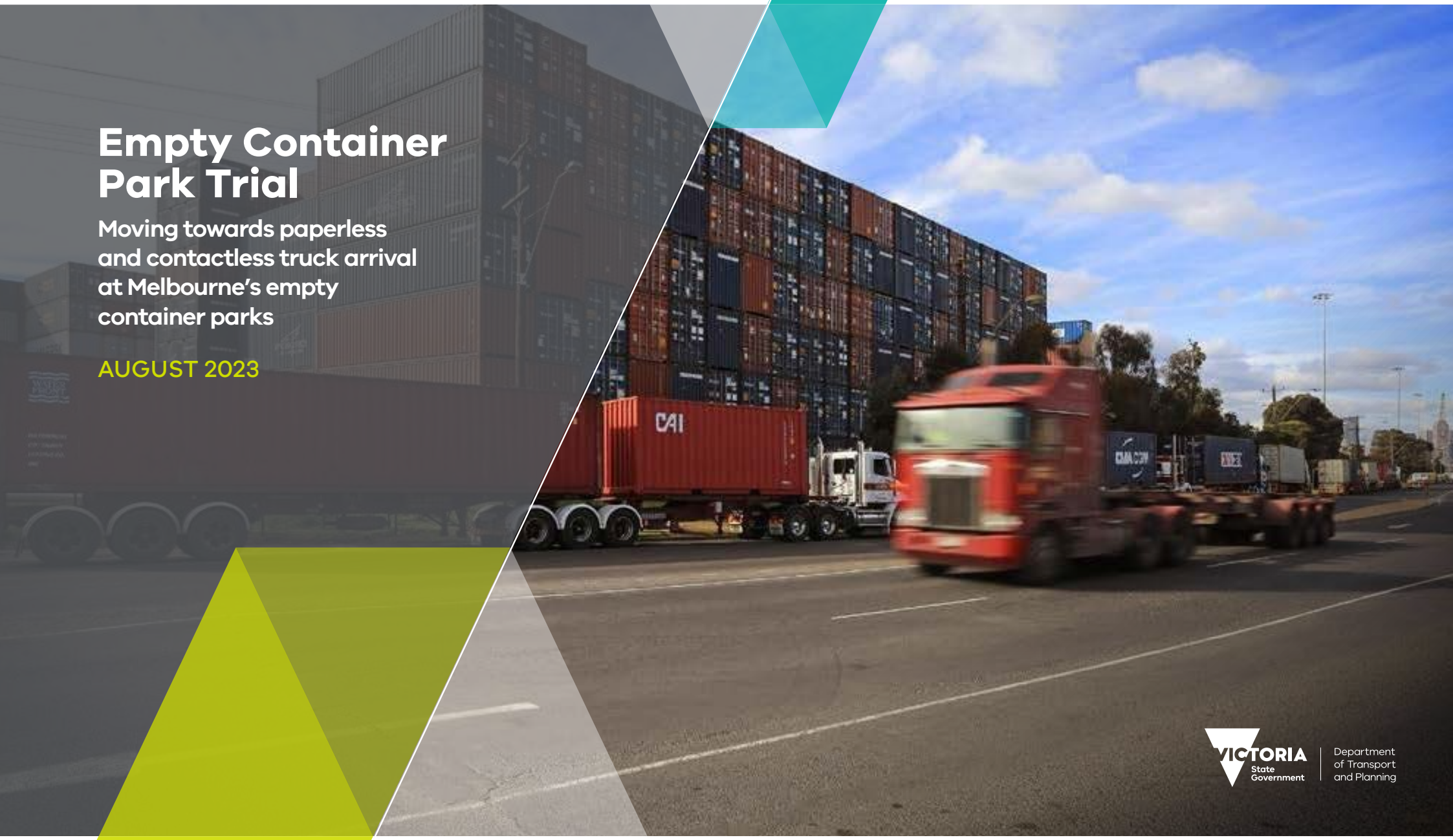
Empty Container Park Trial

Moving towards paperless and contactless truck arrival at Melbourne's empty container parks

AUGUST 2023



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Acknowledgement of Country

We proudly acknowledge Victoria's Traditional Owners and their ongoing strength in practising the world's oldest living culture.

We recognise that there are long-lasting, far-reaching, and intergenerational consequences of colonisation and dispossession.

The reality of colonisation involved establishing Victoria with the specific intent of excluding First Peoples and their laws, cultures, customs, and traditions. Over time, the development of Victorian laws, policies, systems, and structures explicitly excluded First Peoples Victorians, resulting in, and entrenching systemic and structural racism.

We acknowledge that the impact and structures of colonisation still exist today.

Description of artwork

Aaron Duggan 'Movements Between the Five Clans' 2019, acrylic on canvas.

'The tracks are going between the five clans of the Gunaikurnai and the hands are the symbols of my spirit travelling around the campsites.'

This artwork was created through programs provided by the Torch. The Torch provides art, cultural and arts industry support to Indigenous offenders and ex-offenders in Victoria. The Torch aims to reduce the rate of re-offending by encouraging the exploration of identity and culture through art programs to define new pathways upon release.


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Executive Summary

In 2021, the Department of Transport and Planning (DTP) commissioned the Victorian Empty Container Supply Chain Review (the Review) to provide insights into issues being experienced at that time, and to provide advice on how the empty container supply chain could be included in the Voluntary Port Performance Model (VPPM). Recommendations from the Review are now guiding the development of new performance indicators to provide greater visibility on the performance of the empty container supply chain.

In May 2022 Container Transport Alliance Australia (CTAA) proposed a trial to investigate the benefits of paperless and contactless truck arrival at empty container parks (ECPs), with the Victorian Minister for Ports & Freight announcing support for the initiative shortly thereafter. DTP has worked closely with CTAA and ECP operators to support the trial. This has included work to define empty container performance indicators and measure outcomes from more efficient truck arrival entry processes.

In recent years, various ECPs in Melbourne and other cities have made operational changes to improve productivity and reduce truck turnaround times (TTT). This includes paperless gate entry, which allows trucks to enter an ECP without drivers needing to leave their vehicle to present information at a site office. To examine the potential for benefits associated with automated truck processing, the trial focused on comparing TTT for ECPs applying differing levels of automation for managing trucks arriving at sites. ECPs were classified into one of three categories depending on whether they were assessed as having either a low, medium, or high level of automation based on common arrival processes.

Data on truck movements and turnaround times was provided by Containerchain and Transport Certification Australia (TCA) to calculate key metrics to provide insight into the impact of automation in truck arrival processes on overall efficiency at ECPs. Along with average TTT, metrics also included trucks serviced per hour, and truck operating savings.

Automation of truck arrival processes and supporting systems were found to improve truck turnaround times at ECPs by up to 32%

The analysis showed that ECPs categorised as having medium and high automation had a peak time average TTT of 17.7 minutes, around 32% faster than the ECPs classified as having low automation. A similar time saving was associated with off peak times, with ECPs categorised as medium and high automation experiencing 20% faster TTTs compared to those classified as having low automation. Furthermore, ECPs categorised as having medium and high automation serviced more than double the number of trucks per hour as compared to parks categorised as low automation.

Analysis revealed that transitioning from a low automation category to a medium or high automation category could result in an average TTT reduction of 6.15 minutes, which would translate to an operating cost saving of approximately $13.53 per truck, or an annual operating cost saving of approximately $5.75 million for the Victorian container transport industry as a whole[1].

These findings provide a useful indicator of the potential for time savings that can be achieved from the adoption of automated truck processing. There are however several other variables that could lead to more efficient truck processing that were not considered in the study, such as the size and location of the ECPs, or the area available for staging and waiting.

The trial was supplemented by a transport operator survey conducted by DTP in March 2023 to capture industry views on the current operations and performance at ECPs and identify areas of improvement. Feedback from the operators emphasised the need for more efficient and faster truck arrival processes at ECPs.

Increasing automation for truck arrivals can provide an estimated $5.75M in annual cost savings to container transporters

The survey indicated that faster and more consistent turnaround times are important to all transport operators, with most respondents indicating that they were open to following new processes to improve TTT and truck arrival.

Findings from the trial show that modest improvements to arrival processes, such as having basic pre-receival information, can have a material effect on TTT and site throughput.

Adopting technological solutions that automate the truck entry process and facilitate high rates of data exchange can achieve efficiency benefits at ECPs and for the broader supply chain. Transport operators play an important role in achieving increased efficiency outcomes through consistently complying with rules set by container parks. This helps speed up the flow of vehicles for all customers and helps avoid unnecessary congestion.

DTP is to develop an ECP TTT performance measure in the Voluntary Performance Monitoring Framework (VPMF) dashboard, based on aggregated data like that presented in this report. DTP will also work with ECP operators on further measures that could be included in the future, such as ECP utilisation, slot availability and utilisation and TTT for individual sites. This work will be undertaken by the Industry Representative Group (IRG) as part of implementing the Voluntary Code of Practice (VCoP) for the landside container freight supply chain.

1 *Based on an average truck running cost of $132 per hour. Assumption sourced from consultations with CTAA.*

Introduction

Container trade in Victoria is forecasted to grow from current levels of around 3 million TEU to around 6.5 million TEU by 2053[2] By 2030-31, empty containers will be largest container export for the state[3]. Efficiency improvements along the supply chain will be vital for managing this growth.

For every loaded import or export container moved in Victoria, there is a corresponding empty container movement. Empty container parks (ECPs) play an integral role in the Port of Melbourne (PoM) container freight supply chain. Empty container handling is an essential supply chain function and impacts on the cost of moving freight in Victoria. In recent years, issues such as trade disruption and port congestion have created challenges for the landside management of containers and the storage of empty containers.

Some commercial and operational practices in the supply chain are also placing pressure on transport operators and cargo owners.

A significant aspect of the movement of empty containers is the receival and delivery activity which occurs at ECPs with transport operators. Empty containers from imports are delivered by freight trucks to ECPs for 'dehire' and picked up (received) for use in export freight movements. The interaction of trucks at the entry point of the ECP involves a booking process in advance of arrival, and processes to acknowledge truck arrival on site.

Each ECP in Melbourne operates somewhat differently, with varying levels of physical interaction between gatehouse clerks and truck drivers on arrival at the site, and varying levels of process and system automation to facilitate arrival in operations systems. Industry has consistently reported that more time is spent at ECPs which have manual truck entry processes compared to those with automated processes.

This ECP trial investigates the different processes and systems present in ECPs across Melbourne and measures the overall truck servicing time differential between those ECPs with greater levels of automation and those with manual processes.

This report presents findings from the trial. The report provides an overview of the container supply chain, information on the trial and summarises industry feedback and improvement opportunities. The report includes an assessment of the benefits that can be achieved through increased use of paperless and contactless truck arrivals at ECPs.

2 *Deloitte Access Economics Trade Forecasts, Port of Melbourne, 2023.*

3 *Ibid, p.11*

Overview of the empty container supply chain

An ECP is a facility used for storing and handling empty shipping containers before they are reused for exports or returned to overseas markets. ECPs are generally located near the Port of Melbourne and in the metropolitan area to the west of the port (Appendix A). Approximately 100,000 twenty-foot-equivalent units (TEU) of container capacity exists across Melbourne's ECPs at any given time. Further information about ECPs including capacity, opening hours and contact details can be found in the Container Storage Working Group Industry Guide released by DTP in 2022.

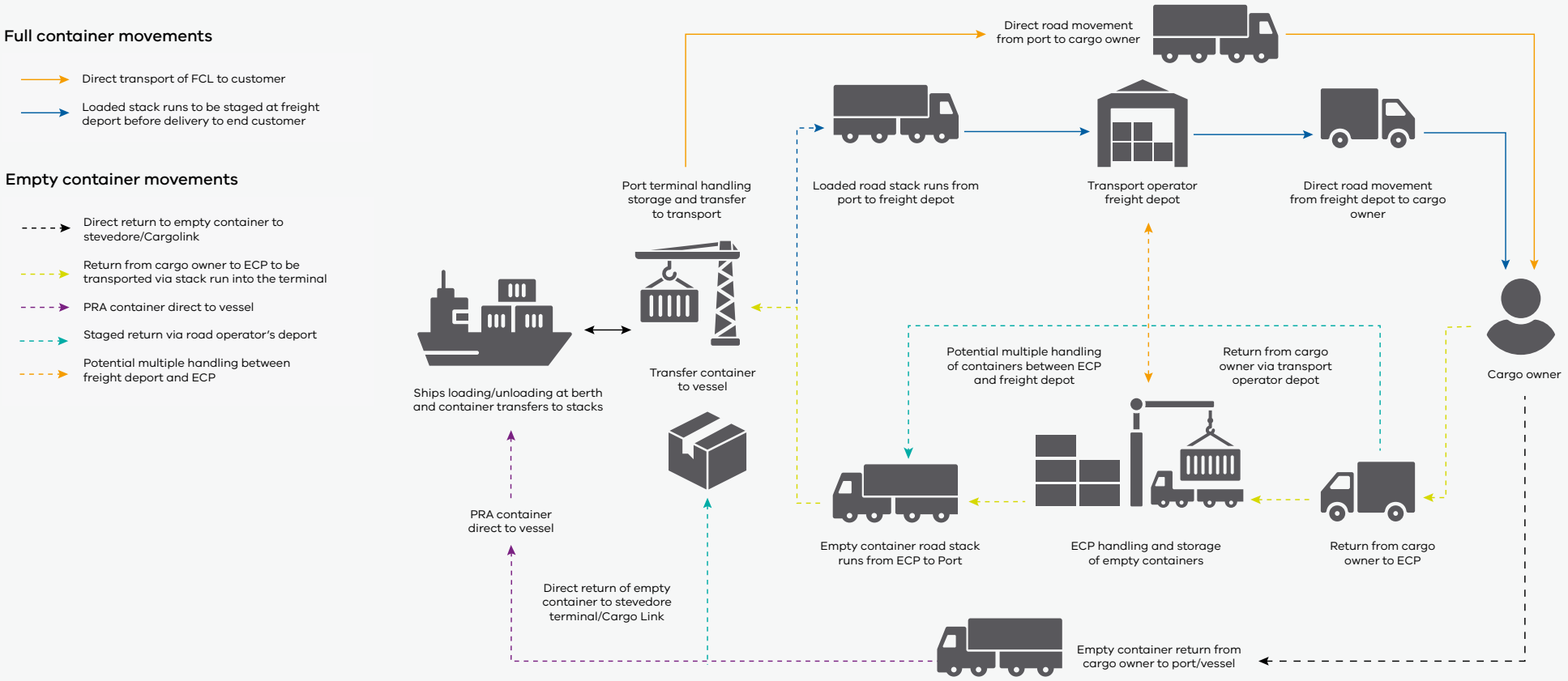
As with stevedore terminals, transport operators and truck drivers use electronic systems to book slots (truck arrival 'notification windows') at ECPs and to pay fees. The main system used by ECP operators is Containerchain, with the OneStop Modal system currently used at two ECPs in Melbourne (Patrick Cargolink and Containerspace). These systems require transport operators to enter truck registration details and information about the container they are returning or need to collect. Systems operated by ECPs store information on containers on behalf of shipping lines. ECP booking systems may store reference data which allows container information to be automatically pre-populated during the booking process when shipping lines have provided the necessary electronic information about the import empty dehire location.

In circumstances when the shipping lines have not provided the electronic information, transport operators are required to manually enter details about containers.

Various operating models are currently used at ECPs, with differing levels of electronic information and approaches for managing trucks when they arrive at sites. These range from gate entry procedures that involve truck drivers leaving their vehicle to report to an office with paper-based (or screen-based) information, through to more automated processes that use technology to authorise entry without the need for drivers to leave their vehicle.

Most empty containers are currently moved to and from ECPs by trucks, with rail services also transporting empty containers to exporters in regional Victoria. In the future, rail is expected to play a much greater role in transporting empty containers in the metropolitan area because of the Port Rail Transformation Project and Victoria's new Port Rail Shuttle Network. Typical pathways taken by containers including movements to and from ECPs are shown in Figure 2.

Figure 1: Typical pathways in the container freight supply chain.



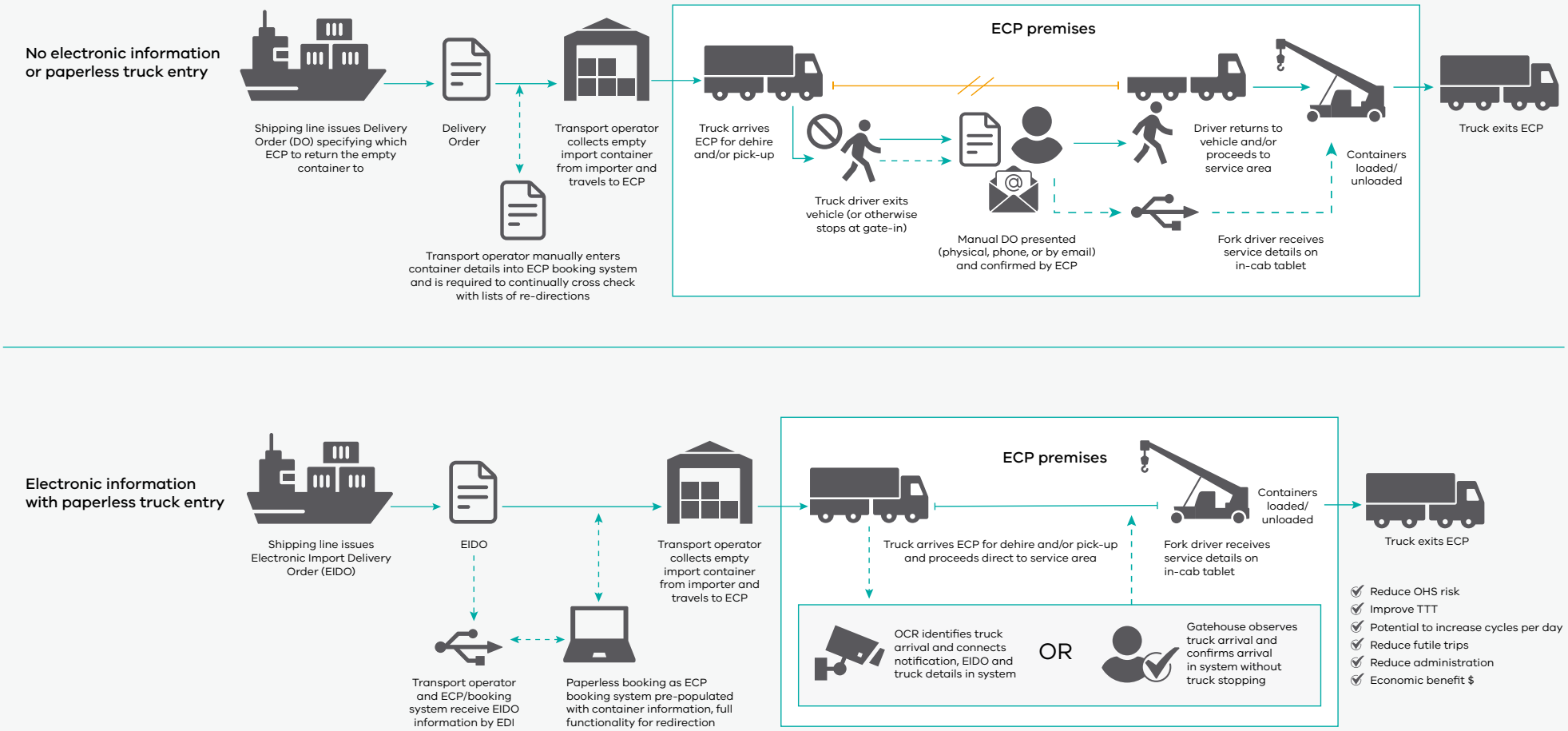
Source: Container Storage Working Group Industry Guide, p.8

Information and data exchange is important given the different organisations that are involved in the landside movement of containers. Electronic Import Delivery Orders (EIDOs) which contain information about the container and its nominated return location are issued by shipping lines to stevedores and booking systems used by ECP operators. Low or inconsistent use of electronic delivery orders in ECP booking platforms place an administrative burden on transport operators and ECPs, increase the risk of double handling containers, and increase TTT[4].

The process map (Figure 2) shows differences between approaches that do and do not use electronic information and paperless entry.

4 *NineSquared (2021) Strategic Review of the Victorian Empty Container Supply Chain, Report prepared for Freight Victoria, p.33*

Figure 2: Process map - electronic information with paperless entry vs. analogue/manual approach.



In recent years, various ECPs in Melbourne and other cities have made operational changes to improve productivity and reduce TTTs. This includes paperless gate entry, which allows trucks to enter an ECP without drivers needing to leave their vehicle to present information at a site office.

The benefits of paperless and contactless truck arrival processes are discussed further in the following case study.

Case Study: Benefits of paperless and contactless truck arrival

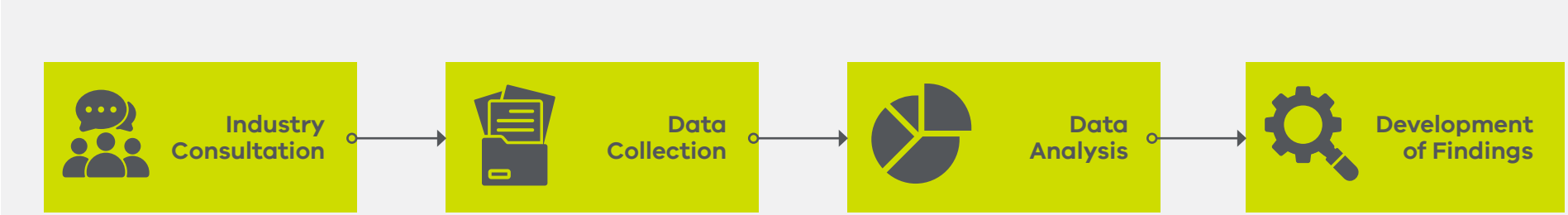
In 2021, DTP engaged with industry through the Container Storage Working Group (CSWG) and industry forums to understand opportunities for improving efficiency in the container freight supply chain. Discussions have identified various productivity and efficiency improvements that could be achieved through paperless and contactless truck arrival at ECPs.

These include:

- Reduction in truck turn times, leading to cost savings and improved vehicle utilisation (i.e., increased number of truck cycles per day)
- Reduction in futile trips arising from incorrect paperwork
- Reduced Occupational Health and Safety (OHS) risks to drivers through reducing the need to exit vehicles in operational sites (other than to undo / do-up twist locks)
- Greater consistency of servicing times, enabling reduction in 'buffer' time allowances in cycle planning
- Productivity and efficiency improvements for ECPs, including increased throughput capacity
- Reduced and simplified gate-house administration.

DTP indicatively estimated the magnitude of benefits that could be achieved under a scenario of improvements being made at all sites. Improving truck turn times at all ECPs by 10 minutes could save the container transport industry up to $20 million per year in truck running costs[1]. The objective of the Trial was to estimate actual benefits that could be achieved based on performance of different ECPs.

Trial methodology



To examine the benefits of more automated truck arrival processes at ECPs, the trial combined qualitative and quantitative analysis and stakeholder consultation to generate the findings and recommendations.

Site visits to a range of ECPs involved in the trial occurred in late 2022 and early 2023, providing insights into the operations and arrival processes across the industry. This enabled appropriate segmentation of ECPs based on the degree of automated processes and systems.

Discussions with ECPs also explored the potential for implementing process and technology improvements and measuring the benefits of these. The vast majority of ECP operators acknowledge the benefits of greater levels of automation and have, or are actively working towards, implementing automated systems.

Demonstrating the benefits of automation was therefore focused on comparing TTT for ECPs applying differing levels of automation for managing trucks arriving at sites to further incentivise the rapid take-up of automation.

To complete the quantitative analysis and ECP profiling, transport operators were surveyed to obtain views on the operation of ECPs and opportunities to improve efficiency.

Segmentation of ECPs

ECPs were classified into one of three categories[5] depending on whether they were assessed as having either a low, medium, or high level of automation based on five common arrival processes. Table 1 describes the three categories and the percentage of ECPs within each.

Common arrival processes	Degree of automation		
	Low (33% of ECPs)	Medium (25% of ECPs)	High (42% of ECPs)
Pre-receival information from shipping lines	No pre-receival information. Transport company required to complete online information and email DO in PDF format to ECP.	Pre-receival information (typically manual excel sheet). Transport operator required to complete online information and email DO in PDF format to ECP.	100% EIDO received.
Driver interaction	Driver exits vehicle to attend gatehouse.	Driver speaks on two-way with gatehouse operator.	No driver interaction required.
Information exchange (from driver)	Physical paper DO presented (or on-screen image).	Information exchanged over two-way – ECP matches emailed EIDO with truck arrival booking.	No information exchange required from driver.
Truck registration number recognition	Driver provides registration details to office.	Cameras used to determine vehicle registration and match to booking.	License Plate Recognition/Facial recognition.
Green light to enter	Verbal go-ahead provided to driver.	Office (person) approves entry without further interaction.	System approves entry without further interaction.

Table 1: ECP automation categories matrix.

5 *The common arrival processes were used as a guide to categorising sites as there were variations in processes and systems applied across individual ECPs.*

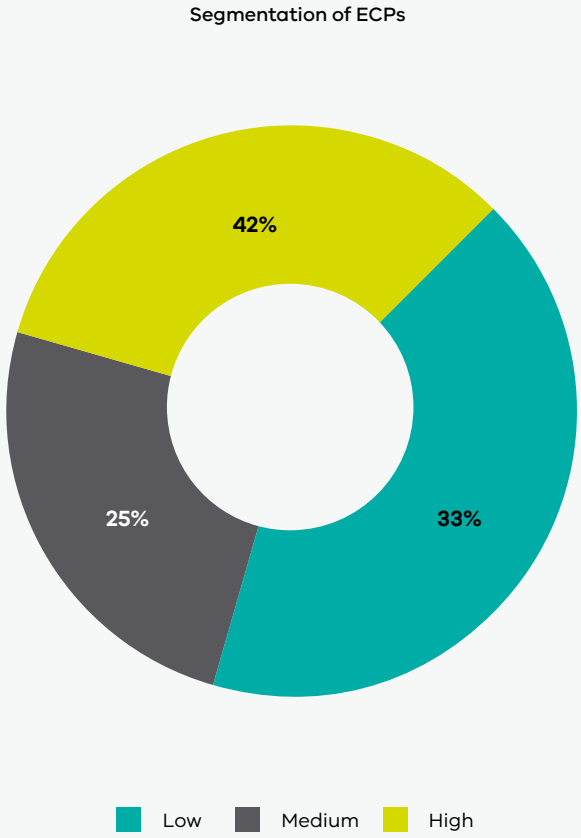


Figure 3: Portion of ECPs by level of process and system automation.

Data analysis

Data was sourced from Containerchain and Transport Certification Australia (TCA) to analyse the difference in performance levels at ECPs based on their automation category.

Two indicators of performance were assessed: **trucks serviced per hour** and **truck turn time (TTT)**.

Containerchain and TCA methodologies for calculating TTT are outlined in Table 2. TCA was selected as the data source for the measure of TTT due to the truck arrival/gate-in process time being captured within the measurement, despite the scope of measurement only including high productivity freight vehicles (HPFVs). Figure 3 depicts the difference in the measurement of TTT from the two data sources.

One third of ECPs in Melbourne have low levels of process and system automation

For the analysis, operating periods were defined as peak – being Tuesday to Saturday, 6am to 6pm – and off-peak – being all other times. Traditionally 'peak' is considered Monday to Friday 6am to 6pm, however the analysis of trucks serviced per hour at ECPs clearly demonstrated that Tuesday to Saturday contains most truck movements.

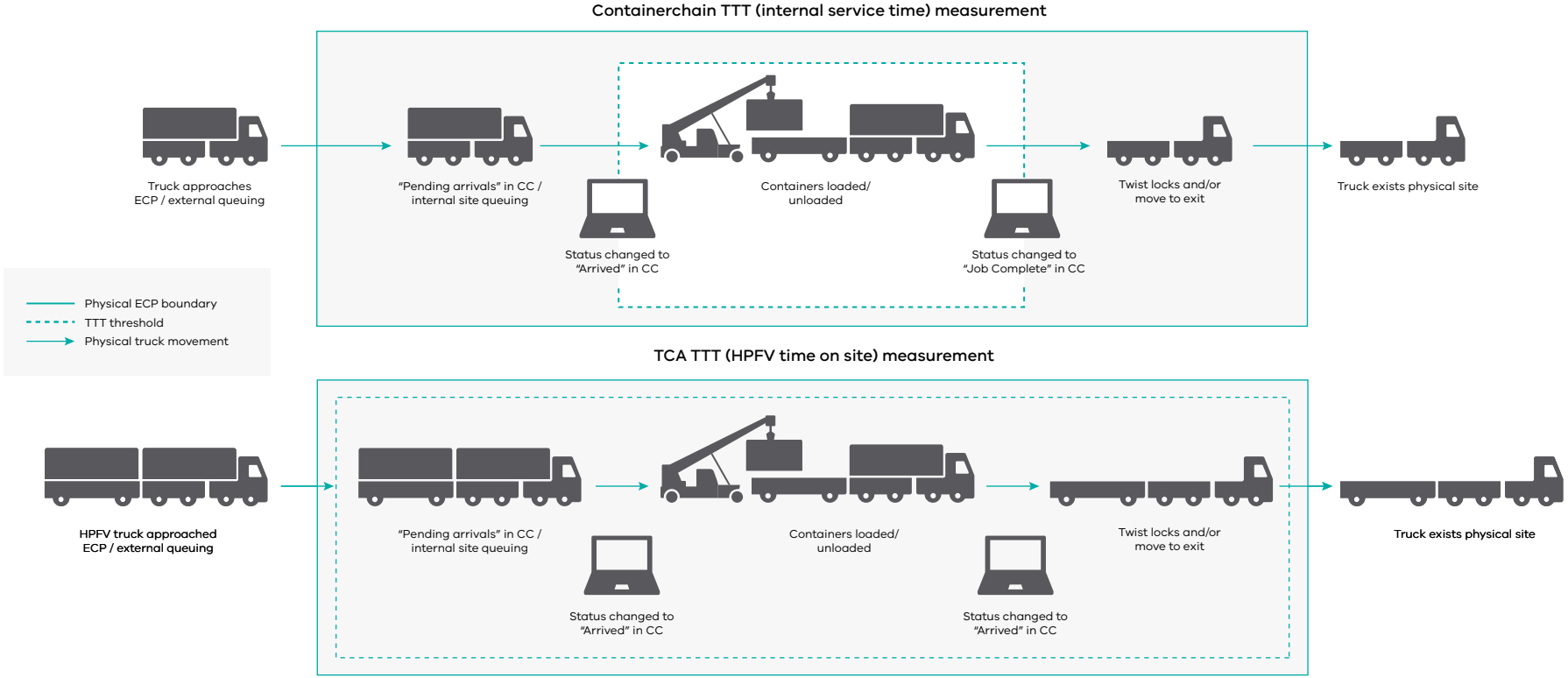
Truck turn time comparison	Containerchain	TCA
Definition	**'Truck turn time'** is calculated from **'Gate in'** to **'job complete'.** **'Gate-in'** time is when the vehicle was authorised to enter the ECP, and the status of the pending truck arrival changed to 'arrived' in the Containerchain system. The 'job complete' time is recorded when the last container is unloaded from the vehicle (dehire) or loaded to the vehicle (export hire) and is confirmed by the forklift operator.	**'HPFV time on site'** is generated from the TCA data obtained only from vehicles enrolled in the Intelligent Access Program (IAP) or other regulatory telematics solutions, based on GPS records within geo-fenced site boundaries. 'Time in' to the ECP is recorded when the truck crosses a geo-fenced boundary around the physical site, with 'time out' being recorded following the truck exiting the geo-fenced boundary.
Limitations	This indicator demonstrates service time efficiency within the operational area of the ECP. However, it does not record the time-period between the vehicle arriving at the site and being registered as 'arrived', i.e., the onsite/pre-gate queuing. Therefore, it is assumed that the Containerchain TTT may not demonstrate the time spent on processes to register the truck arrival, which is the focus of this trial. As approval from individual ECPs was required to obtain the Containerchain data, the dataset does not capture all ECPs in Melbourne, however, is considered a good representation of industry activity. For this reason, the average trucks serviced per hour has been generated using this data.	The TCA data is limited to HPFVs enrolled in the IAP and therefore does not capture all truck movements through ECPs. Average TTT from this data may be slightly higher due to the higher container carrying capacity of HPFVs, which may take longer to load and unload. However, time series trends are expected to be reflective of industry standards. The inclusion of truck arrival lanes within the geofenced areas means that the time on site includes all arrival activities including truck processing. The telematics data is captured at 30-second intervals, creating a small margin of error in the results. Trends are expected to be suitably reflective.
Use in trial	Average number of trucks per hour	Average time on site (TTT) for HPFV
Timeframe	26 months (Jan-21 to Feb-23)	24 months (Jan-21 to Dec-22)

Table 2: Data comparison

The truck operating cost savings used as a headline figure for this report was calculated using a truck running cost provided by CTAA (i.e., $132/hour). This figure was applied to truck movement information to generate an industry **vehicle operating cost (VOC) savings** figure. Datasets from both Containerchain and TCA were used to synthesise a two-year time-series that estimated the number of monthly truck visits to each of the participating ECPs.

The hourly VOC was applied to the reduction in TTT associated with higher automation to generate potential savings to industry because of faster TTTs.

Figure 4: Containerchain and TCA comparison of TTT measurement.



ECP Performance

To measure the impact of truck arrival processing automation, ECP performance by automation category (i.e., low, medium or high) was assessed for a two-year period from January 2021 to December 2022.

Aside from truck arrival processing automation, it should be noted that there are several other factors that could impact on ECP performance, such as labour and equipment availability, location, size, and layout of the site, or the area available for staging and waiting, to name a few. For this reason, for some metrics, low automation sites are compared with an average of medium and high sites to smooth out the effects of external variables on performance, and to showcase the potential benefits of transitioning towards paperless entry and greater automation.

Average TTT

The analysis (Figure 5) demonstrates ECPs with higher levels of process and system automation had on average 32% faster TTT – or 8.3 minutes – during peak periods than those with low levels of automation.

A similar time saving was associated with off peak times, where TTT was 4 minutes (20%) faster at ECPs with higher levels of automation.

These results provide a useful indicator of the potential for time savings through the adoption of automated truck processing.

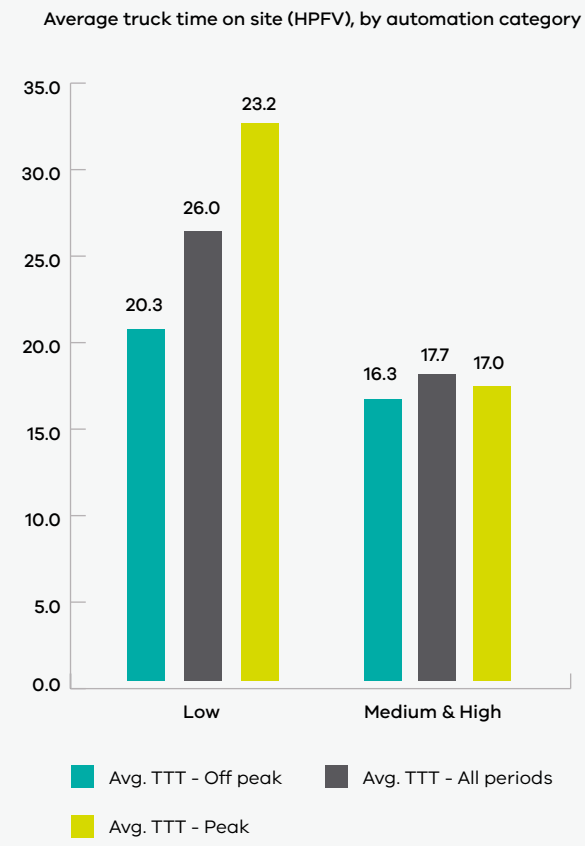


Figure 5: Average Truck Time on Site (HPFV), by ECP automation category.

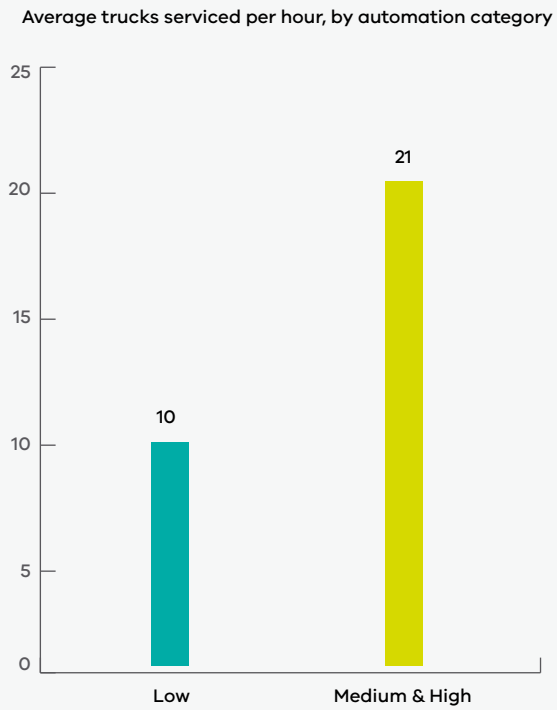


Figure 6: Average trucks serviced per hour, by ECP automation category.

Trucks Serviced per Hour

Containerchain data was used to calculate a theoretical average number of trucks serviced per hour for each category of ECP in the trial. This data was coupled with assumptions on ECP operating hours to provide an insight into operating efficiency at the parks. Figure 6 shows the average trucks serviced per hour for ECPs with low levels of automation as compared to those categorised as medium and high automation.

This shows that ECPs categorised as having medium and high automation serviced more than double the number of trucks per hour as compared to ECPs categorised as having low automation. Although the number of trucks serviced per hour can be influenced by a range of different variables, this highlights another correlation between efficiency improvements and increased automation. Commercial benefits to ECP operators in addition to truck operating cost savings for transport operators is associated with improved TTT.

Vehicle Operating Cost Savings

The transition of ECPs from the low automation category to higher levels of automation is estimated to improve TTT by approximately 6.15 minutes. This would translate to an estimated operating cost saving of $13.53 per truck trip, or an annual operating cost saving of approximately $5.75 million across all ECP movements by the container transport industry as a whole.[6] Additional benefits arising from increased automation would also result in financial benefits or savings to the industry but have not been calculated as part of this trial. For example, lower emissions, reduced manual administration, greater throughput, etc.

The analysis has shown that for some metrics, adopting even basic automated processes (i.e., from transitioning from low to medium category) results in achieving significant efficiency benefits.

6 Based on an average truck running cost of $132 per hour. Assumption source from consultations with CTAA.

Transport industry views

DTP conducted a qualitative online survey for transport operators in March 2023 to supplement the quantitative analysis and to capture industry views on the current operations and performance at ECPs and identify areas of improvement. Twenty-two complete responses were received from a range of transport operators of various sizes, reflecting good coverage of the transport industry. On average, operators handled 942 TEU per week to and from ECPs.

Futile trips to ECPs are a significant issue, with almost half of the operators surveyed experiencing more than 5 futile trips per week

No stock and late redirections were the primary reasons for futile trips

Feedback from operators emphasised the need for more efficient and faster truck arrival processes at ECPs. The survey found that quicker and more consistent turnaround times are important to all transport operators, with most responses indicating that they were open to following new processes to improve TTT and truck arrival.

A major issue highlighted by transport operators was the number of futile trips each week to ECPs. In an average week, 45% of respondents experienced more than 5 futile trips, with 18% of these experiencing more than 10 per week. These futile trips add to higher TTT as trucks are either kept at the gatehouse to sort through the issue or they are turned away adding significant cost to the transport sector in re-booking notifications at ECPs and unproductive travel time.

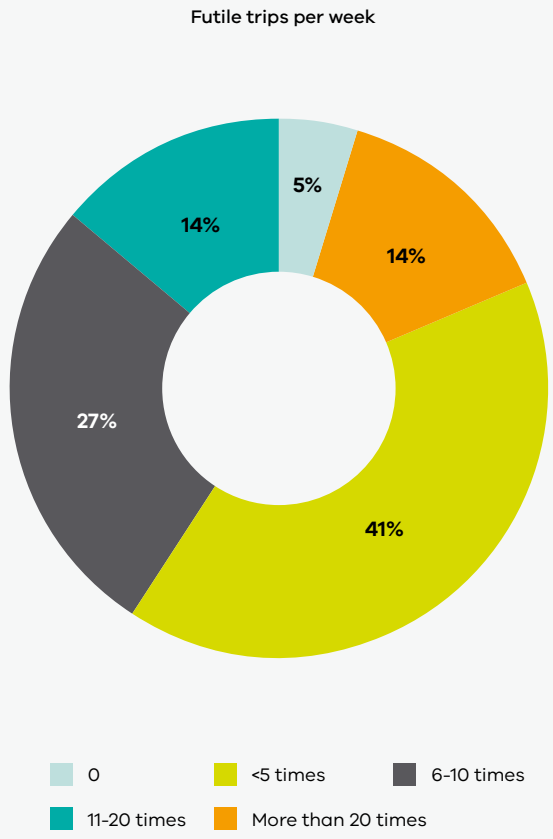


Figure 7: Approximate number of futile trips to ECPs per week.

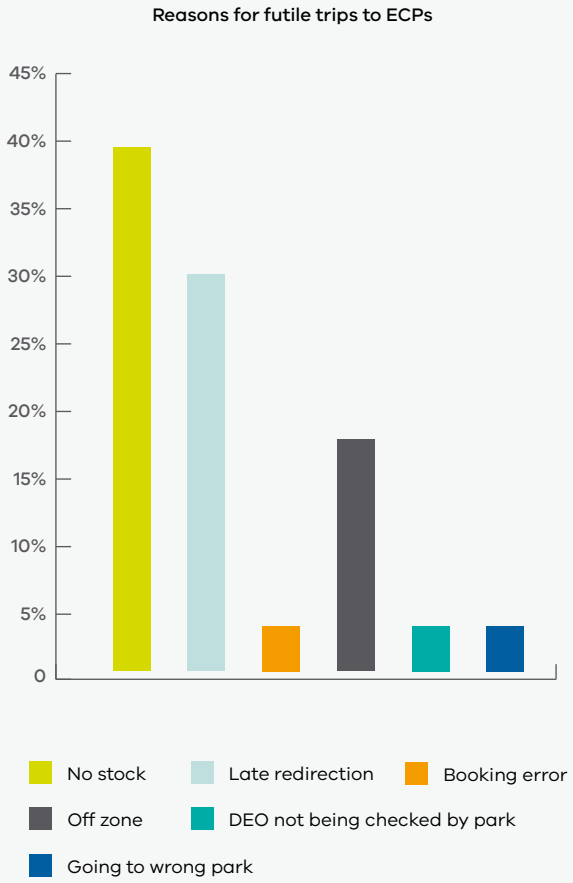


Figure 8: Reasons for futile trips to ECPs.

By far the primary reason accounting for almost 40% of responses for futile trips was no export empty container stock on arrival (of the right size, grade, or type), which is not communicated in advance of the truck arriving at the park. Additionally, 30% of responses indicated that late redirections were the reason for futile trips to parks. A "redirection" is when the shipping line (and/or ECP) change the dehire location for import empty containers from that originally communicated to the importer and their transport provider on the EIDO.

Both issues could potentially be avoided by using an automated pre-receival information sharing procedure or receiving more detailed EIDO, highlighting the value of automated truck arrival processing and data sharing.

Seventeen percent of futile trips are estimated to be caused by trucks arriving "off zone", meaning they arrive well before or well after their booked arrival window. Most ECPs allow a leeway of between 30 minutes to an hour before the booked 30-minute arrival window, and 30 minutes to an hour after the arrival window. Trucks outside these thresholds may be turned away.

Respondents were asked to identify the ECPs with which they are most satisfied, with the top reasons for providing positive feedback associated with greater levels of automation at the truck arrival point and good customer service, including:

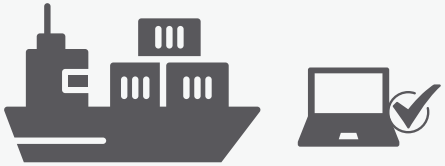
- Helpful, flexible, and improved responsiveness to requests
- Seamless, quick, and easy processing of trucks
- Paperless arrivals
- Quick and easy turnaround times
- Less frequent queues.

Improving efficiency

Findings from the trial highlight the benefits that can be achieved from short term improvements in operating protocols and the use of technology.

Other benefits will be achieved through automation for different stakeholders. For example, efficiency gains associated with increased labour productivity, increased utilisation of equipment (e.g., more forklifts or better forklift utilisation) and safety benefits associated with fewer physical movements, to name a few. This analysis was limited to truck entry processing performance indicators, which show that ECPs that have adopted medium and high levels of automation have broadly comparable performance.

Pre-receival information from shipping line



Administrative processes to pre-populated container information to notification system

Traffic light signals

Clear signals for drivers to 'proceed' to service area

Vehicle arrival cameras

Identify truck rego approach to gatehouse to process 'arrival' in systems

Alignment with notification and arrival processes

Truck on-time arrival to ECPs and correct booking details

Quick wins

The similarity in results for sites with medium and high levels of automation suggests that modest improvements to arrival processes can have a material effect on TTT and site throughput. Improvements such as having basic pre-receival information, using cameras to match a vehicles' registration against its booking, and having a green/red light entry system are investments which can greatly improve site efficiency.

Truck drivers play an important role in improving efficiency. For example, following ECP processes and protocols is important:

- Following notification/booking practices
- Arriving at the time of booked timeslots
- Being responsive to instructions from ECP staff (e.g., moving to an appropriate area to wait if there are issues with the notification slot booking).

Consistently 'following the rules' set by ECPs helps speed up the flow of vehicles for all customers and avoids unnecessary congestion. In situations where protocols are not followed facility operators may refuse service.

Automation

Automating arrival processes with appropriate technology solutions is the goal for managing truck arrivals at key nodes in the supply chain, including ECPs. Various technology solutions can automate the truck entry process, such as license plate recognition cameras and facial recognition.

An important step to realise the full benefits of these technologies is linking truck recognition systems on arrival at the ECP and connecting this information to notification and site operating systems, such as Containerchain or OneStop. Middleware – which take outputs from one system to generate inputs to the notification platform – is critical. It is understood that solutions are currently being investigated by key stakeholders involved in these systems.

Full automation has benefits for transport operators and ECPs such as efficient use of labour and equipment, and increased throughput capacity[7].

7 *NineSquared (2021) Strategic Review of the Victorian Empty Container Supply Chain, Report prepared for Freight Victoria, p.43.*

Data exchange

Automating processes and systems ultimately require the exchange of data and information between stakeholders. Low or inconsistent provision of EIDO increases administrative burdens for transport operators and ECPs and results in the need for time-consuming administrative workarounds or paper (or on-screen equivalent) documentation exchange[8]. High rates of data exchange have been a key enabler for automation implemented at ECPs in Fremantle (see case study at Figure 9). In Melbourne, shipping lines own and operate several ECPs which provides greater opportunities to share and use data to enable automation compared to some other Australian ports.

An important next step to improve efficiency at ECPs for truck arrivals is ensuring that all shipping lines move toward full EIDO provision to notification systems. This has been demonstrated in Fremantle where almost all shipping lines provide EIDO information to ECP operators and/or the notification systems to facilitate truck arrival to sites. ECP operators, peak bodies, and DTP each have a role to play in campaigning shipping lines to move toward full EIDO.

Efficient ECP operations – Port of Fremantle

Fremantle Port provides an example of best practice in the management of empty containers. Paperless gate entry processes at ECPs near the port have been in place for some time. Containerchain's eGate and Driver mobility products are used by ECPs in the port precinct which allows drivers to drop off and collect empty containers without leaving their vehicles.

Fremantle Ports, as the owner of land leased to the major ECP operators, has played an important role in facilitating greater use of technology, through operational performance indicators within lease arrangements to incentivise performance and ongoing work with industry through the WA Port Operations Taskforce.

Exchange of electronic data has been a critical enabler for these solutions. Around 90% of DOs at the Port of Fremantle from shipping lines into Containerchain are communicated electronically, contrasting with levels of 70-75% at the Port of Melbourne.

Sharing of this data has also streamlined the booking process for transport operators as container information is pre-populated within the system and prevents the need for manual data entry during the booking process. It also eliminates the need to email copies of the EIDO to the ECP or have the driver either carry a paper copy of the EIDO or an on-screen version.

Figure 9: Case study – efficient ECP operations at the Port of Fremantle, Western Australia.

8 *Ibid, p.33.*

Sources: NineSquared (2020) Strategic Review of the Victorian Empty Container Supply Chain, Report for Freight Victoria, p.33. Containerchain (2020) 'Fremantle port embracing digitisation with outstanding results' Article by Andrew Smith for Freight Trade Alliance's Across Borders, Spring 2020. NineSquared (2019) NSW Empty Container Study, Report for Transport for NSW, p.37.

Next steps

Government and industry both have a role to play to improve the efficiency of the container supply chain, including the movement and handling of empty containers. Through transparency of performance and targeted action to improve processes and systems, increased network capacity and efficiency gains are possible along with cost savings for operators and ultimately consumers.

Suggested actions and next steps are outlined in the following pages and summarised at Appendix B.

Expanding the Voluntary Performance Monitoring Framework

In consultation with ECPs, data providers and industry, DTP will develop and incorporate performance indicators related to the empty container supply chain and ECP operations into the VPMF. This is reflected as an action in the Victorian Commercial Ports Strategy to facilitate a more end-to-end view of the supply chain. This will build on current work underway by DTP to add ECP indicators along with quayside measures like vessel off window arrival, vessel berthing and forecast port activity.

Increase automation of truck arrivals at ECPs

As this trial has indicated, there are many benefits in moving to higher levels of automation for truck arrival at ECPs with a substantial improvement in TTT possible. ECPs that do not currently have automated processes and systems to realise these demonstrated efficiency benefits can take the following steps:

1. Campaign shipping lines which do not currently provide full EIDO
2. Obtain and upload pre-receival details to ECP booking systems
3. Visually observe truck registration on arrival to ECP to reduce the need for drivers to exit vehicles
4. Implement automated truck/driver recognition technology (e.g., license plate recognition, etc.)
5. Develop and/or implement suitable middleware to automate arrivals in notification booking systems.

Whilst full automation of arrival processes is desirable in the long term, process improvements which may include some administrative effort has demonstrated greatly improved truck arrival and service times at ECPs.

Increase provision of EIDO by shipping lines to ECPs and/or notification systems

Shipping lines are an important partner in the container supply chain and although much of this research is based on the landside management of containers, shipping lines can make changes and assist landside operators to make meaningful process and efficiency improvements.

The most notable point is the encouragement of shipping lines to share information on empty container location directly with ECPs and notification booking system providers. Ensuring that this information is accurate and timely provides substantial benefits to landside operators, their customers (importers, exporters and freight forwarders) and ECPs given the significant added administrative and logistics burdens of re-entering container data, emailing PDF versions of DOs to ECPs and ensuring a copy of the DO is carried by the driver (paper or on-screen).

Reduce futile trips and management of redirections

Early communication of data by shipping lines also assists in managing redirections and reducing the prevalence of futile truck trips if container stock is unavailable.

Shipping lines should allow their ECP providers to contact transport operators in circumstances where a valid truck arrival booking has been made against a legitimate export release authorisation, but the empty export stock is unlikely to be available to match the booking. In this way, futile truck trips will be minimised, and arrangements can be made to source empty export container equipment from the ECP once stock is available or from an alternative location.

Also, shipping lines should allow ECPs to broadcast messages about low export empty availability (by container type, grade, or size), to encourage early communication between shipping lines, ECPs and transport operators about alternative arrangements.

Alignment of truck arrivals with notification windows

Transport operators also have a key part to play improving efficiency in the supply chain. The transport operator survey highlighted off zone truck arrivals as a major reason for futile trips to ECPs.

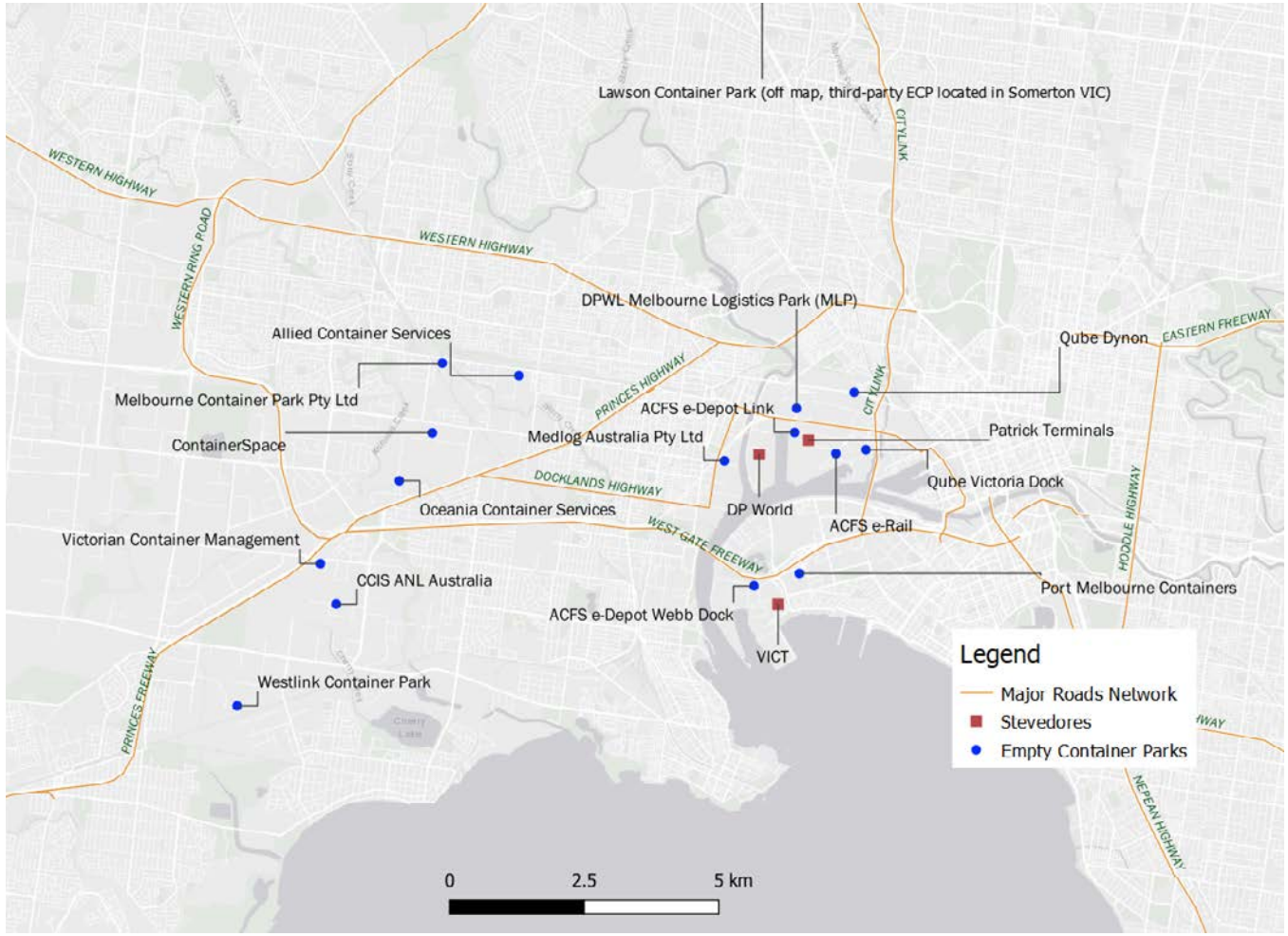
The survey found that 17% of futile trips were due to trucks being off zone. This is a direct efficiency issue for transport operators. Transport operators are encouraged to review internal processes and ensure bookings are made at appropriate times, with the aim of ensuring that truck arrivals match booking times as closely as possible.

Conclusion

The ECP trial conducted by DTP and CTAA aimed to identify the difference in service performance at ECPs with differing levels of process and system automation. The findings demonstrated that those ECPs with higher levels of automation also delivered faster TTT to trucks accessing the site and serviced more trucks per hour. Moving to greater levels of automation could achieve an operating cost saving of $13.53 per truck trip, or an annual operating cost saving of approximately $5.75 million across the Victorian container transport industry.

To monitor ongoing performance of ECPs, DTP will work with industry to expand the VPMF to include additional performance indicators for the management of empty containers, including TTT, containers per truck movement, and notification slots released and used. Other actions which this trial identifies as being important to improve efficiency for truck arrivals to ECPs are summarised in Appendix B. Findings suggest that accessing pre-receival information for ECPs to input to notification systems can provide the greatest benefit to industry in the short term.

Appendix A: Location of Melbourne's ECPs



Map: ECP locations around the Melbourne metropolitan area, NineSquared (2021) Strategic Review of the Victorian Empty Container Supply Chain, Report prepared for Freight Victoria, p.14.

Appendix B: Summary action plan – improving the efficiency of ECP truck arrivals

Key issues impacting truck arrival efficiency at ECPs

- Drivers exiting vehicles to attend gatehouse
- Off-window arrivals
- Paperwork (or on-screen equivalent) required on arrival
- Excessive truck queuing prior to in-gate processing
- No EIDO provided by shipping line
- Pre-receival information not in notification systems
- No container stock (for export hire)
- Late redirections

Government

a. Expand the VPMF to include additional indicators of ECP, shipping line and transport operator performance
   - TTT, including HPFV time on site (TCA) and service time (Containerchain)
   - ECP storage capacity utilisation
   - Notification availability and use
   - Futile trips
   - Containers per truck movement

b. Monitor progress of actions contained in this report in consultation with industry

ECPs

a. Continue to campaign shipping lines which do not currently have full EIDO

b. Upload pre-receival details to notification systems

c. Reduce need for truck drivers to exit vehicles (other than to do their twist-locks)

d. Consider investment in gate entry processes and depot layout / operations to minimise truck turnaround times (TTT)

e. Visual observation of truck registration on arrival

f. Investigate license plate recognition technology (or similar)

g. Encourage middleware development in consultation with Containerchain or other technology providers

h. Monitor truck arrival performance such as on-window arrival

Shipping Lines

a. Provide pre-receival advice to ECPs to facilitate advanced data entry to notification systems

b. Provide EIDO information on return location to ECPs through notification system providers to enable automated truck arrival

c. Work with industry to develop appropriate processes and protocols to minimise futile trips, such as redirections and alerting operators of stock levels prior to arrival at ECPs

Transport Operators

a. Ensure adherence to notification and arrival processes required by ECPs

b. Monitor for redirections

Notification system providers

a. Develop middleware options in consultation with ECPs to facilitate automated truck arrival

Industry associations

a. Promote adherence by transport operators to notification windows

b. Facilitate discussions to continue to address the productivity improvement actions contained in this report

Abbreviations

CSWG	Container Storage Working Group
CTAA	Container Transport Alliance Australia
DO	Delivery Order
DTP	Department of Transport and Planning
ECP	Empty Container Park
EDI	Electronic Delivery Information
EIDO	Electronic Import Delivery Order
GPS	Global Positioning System
IAP	Intelligent Access Program
IRG	Industry Representative Group
OCR	Optical Camera Recognition

OHS	Occupational Health and Safety
PoM	Port of Melbourne
TCA	Transport Certification Australia
TEU	Twenty-foot Equivalent Unit
TTT	Truck Turnaround Time
VCoP	Voluntary Code of Practice
VOC	Vehicle Operating Costs
VPMF	Voluntary Performance Monitoring Framework
VPPM	Voluntary Port Performance Model

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