The "Close" Dry Port Concept and the Canadian Context

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Abstract

A "dry port" is defined as "an inland intermodal terminal directly connected to a seaport, with high capacity traffic modes, where customers can leave/collect their goods in intermodal loading units, as if directly at the seaport". There are three types of dry ports: "distant" dry ports, "mid-range" dry ports and "close" dry ports. This paper will consider several examples in Europe, New Zealand and North America and suggest their applicability in one Canadian city. The issue is important from a "sustainability" or "social license" standpoint, in terms of container movements within congested urban areas. They also have the potential to provide efficient a means for coastal ports to extend their markets inland, as well as improve terminal efficiency.

Introduction

There is a rich and growing body of literature and studies relating to a number of related concepts – inland terminals, inland ports, logistics parks, cargo villages, distriparks, and dry ports.[1]

There have been numerous initiatives in Europe, but especially the Baltic and North Sea regions, which have been promoting the concept of "dry ports," inland freight terminals or inland ports, along with transport logistics centres, and rail service. SustAccess, which promotes Sustainable Accessibility between Hinterlands and Gateways around the North Sea, views them as critical infrastructure in the development of gateways, which themselves are viewed as "promoting sustainable and efficient transport and logistics".[2]

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[1] See Violeta Roso, "The Dry Port Concept", Chalmers University, PhD thesis, 2009.

[2] "Feasibility Study on the Network Operation of Hinterland Hubs (Dry Port Concept) to Improve and Modernize Ports' Connections to the Hinterland and Improve Networking", Integrating Logistics Centre Networks in the Baltic Sea Region, FDT

A dry port is defined as "an inland intermodal terminal directly connected to a seaport, with high capacity traffic modes, where customers can leave/collect their goods in intermodal loading units, as if directly at the seaport".[3] It also provides a "set of efficient services such as transhipment, storage, depot, maintenance of containers, customs clearance, and tracing and tracking".[4]

A fully functional dry port is believed to increase the energy efficiency and the environmental performance and relieve road congestion of port cities.[5] Removing seaport functions from the port area also frees up valuable space on waterfront lands.

There are three types of dry ports: "distant" dry ports, "mid-range" dry ports and "close" dry ports. In the North American context, a distant dry port would be akin to CN's intermodal terminals in Montreal, Toronto and Chicago. A mid-range dry port would be similar to the Virginia Inland Port (VIP), and is generally a distance away that could also be served by truck. The best example thus far of a "close" dry port in North America is the Alameda Corridor serving Los Angeles/Long Beach.

The "close" dry port concept is very relevant in the Canadian context. In many ports, "the main problems seaports are facing are lack of space or inappropriate inland access".[6] Ports can therefore increase their capacity by establishing a close dry port in their immediate hinterland or at the outer fringes of the city. With increased terminal

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Association of Danish Transport Centres, January 2007; SustAccess, "Improving Connection between Gateways and the Hinterland", Region Vastra Gotaland, November 2005; Andrius Jarzemskis, Aidas Vasillis Vasilliauskas, "Research on Dry Port Concept as Intermodal Node" Transport Research Institute, Transport - 2007, Vol. XXII, No. 3, 207-213.

[3] V. Roso , J. Woxenius., G. Olandersson, "Organization of Swedish dry port terminals", A Report in the EU INTERREG North Sea Programme, Chalmers University of Technology, Gothenburg, 2006.

[4] V. Roso, "Evaluation of the dry port concept from an environmental perspective: a note", Transportation Research, An International Journal, Part D 12 (2007), 523-527.

[5] "Sustainable technology options and policy instruments: Report no. 3 Appendix, European Panel on Sustainable Development, 2006-05-16.

[6] ibid., p. 8.

capacity comes the ability for increased productivity since larger vessels may then call at the port. The close dry port also "consolidates road transport to and from shippers outside the city area offering a rail shuttle to the port relieving city streets and the port gates".[7]

The next section examines several examples of the dry port concept.

Case Studies

Gothenburg, Sweden

Gothenburg, the second largest city (regional population 510,000) in Sweden and largest port in the Baltic, is connected to its hinterland through a network of rail shuttles as well as close, mid-range and distant dry ports. In 2006, the port handled 820,000 TEUs of containers and another 1.0 million short sea roll on-roll off units.

Gothenburg has 24 rail shuttles to various inland destinations including one operated by Green Cargo AB to a fledgling "close" dry port 8 km from the port. This shuttle operates 6 times per week. Gothenburg also has an intermodal freight centre (IFC) or cargo village, which is connected to the Green Cargo dry port. This terminal handled 15,000 TEUs in 2007. About 40% of Gothenburg's container cargo now moves by rail.[8].

Thus far in the gestation of dry ports in Sweden, at least, they have not been linked to the development of distriparks, cargo villages or intermodal logistics centres. A development in Falkoping, some 134 km from Gothenburg has some potential because it is supported by StoraEnso.

At a conference in Liverpool in June 2009, the author was informed that the rail shuttles have become very popular with customers of the port and that companies such as Maersk, StoraEnso and IKEA are big supporters of "green" and sustainable transportation alternatives.

[7] ibid., p. 9.

[8] V. Roso, "The Dry Port Concept: Applications in Sweden", Chalmers University of Technology, Division of Logistics and Transportation, 2005.

Auckland

Since 2005, Auckland has been developing plans for five inland terminals outside the city. The initiative began as a capacity issue for the port, as it was (and is) running out of space on the waterfront. The Auckland region has a population of about 1.15 million and the port handled 812,455 TEUs in 2008. The port is of the opinion that their inland terminal infrastructure will help alleviate congestion both on roads and on the waterside.

The first terminal to be developed was in East Tamaki, primarily serving a large manufacturer of white goods, Fisher and Paykel. This one hectare facility is 18 km from the port, and is only served by truck, primarily in off-peak periods, from 1700-0300 hrs.

A new facility opened in early 2010 in Wiri, about 25 km from the port. This facility is 10 ha in size and is served by rail shuttle. It is expected that a distripark or cargo village will emerge "naturally" and there is another 5 ha available for this purpose.[9]

One of the big challenges is getting shippers to use the terminal. One incentive that has been tried is increasing the demurrage charged at the port and reducing it at the inland terminal. At the port it is NZ$75.00 per day after four days; at the inland terminal it is NZ$20.00 per day after six days. In marketing the facility, the port concentrates on the shipper rather than the shipping line, because the shipper gets better access to cargo and containers.

To some extent, Auckland's inland terminal initiative was also a competitive response to the port of Tauranga, located 320 km away, which has its own inland terminal, Metroport, located within Auckland's city limits. Given its distance from the port, Tauranga's Metroport would be more akin to a North American intermodal port, such as those in Montreal or Toronto, although on a smaller scale. Import / export cargo clears at the terminal in Auckland just as if it was at dockside; the intention is to be located right in the Auckland hinterland and increase market share. The results have been

[9] Interview with Grange Pole, Manager Inland Ports, Ports of Auckland, 22 January 2008.

impressive, with the port increasing its volumes 500% since establishing Metroport, and the intermodal facility itself handling more than 150,000 out of the port's total of 546,521 TEUs in 2008. One major difference between the two concepts is that Metroport does not appear to include a cargo village.

Sydney, Australia

Sydney is the largest container port in Australia, handling about 1.7M TEUs in 2008, and expected to grow to 3.2 million by 2020. A number of years ago, Sydney Ports decided to move its entire container handling facility from Darling Harbour to nearby Botany Bay, about 12 km south of the central business district. A new AU$1B expansion has been underway since 2006.

Coincidentally, the port is also embarking on the development of an Intermodal Logistics Centre (ILC) at Enfield, about 25 km from the city centre and 18 km from Port Botany.[10] The basic terminal will cost AU$200M, which will be provided by Sydney Ports, and both tenants and the operator will spend approximately AU$100 erecting buildings and equipping it.

At the present time, about 85% of the total cargo (50-60% of imports and 30% of exports) originates or is destined to a location within 40 km of the port, but only 20% of the overall total moves by rail. With the development of the ILC and intermodal shuttle service, this proportion is expected to increase to 40%. To be successful it was determined that a potential site had to have:

- close proximity to the area it serves;
- connected to a rail line;
- within easy access of trucking routes;
- located in an industrial area;
- large enough to allow other freight-related activities to take place;

[10] Intermodal Logistics Centre at Enfield, Project Overview, Sydney Ports Corporation, January 2006; See also "Developing Freight Hubs: A Guide to Sustainable Intermodal Terminals for Regional Communities, Department of Transport and regional Services, Government of Australia.

- a large market nearby; and
- environmentally and socially sustainable.

It is expected that each train will carry between 60-80 TEUs. The Enfield ILC is being built on a 60 ha site, with a 12 ha intermodal facility. Total capacity initially is 60,000 units, with potential to grow to 300,000 with further expansion. There will be enough space provided for five warehouses of 3,000-20,500 m2, for which tenders were called in late 2009.

It is expected that the ILC will resulting a competitive alternative to moving containers by truck and that "delivering containers closer to their origin and destination improves delivery cycle times and reduces trucking costs. Empty container storage on site can further reduce costs and unnecessary truck movements, compared to current practice, where empty containers are generally trucked back to the Port Botany area.

As of March 2010, this project was moving into the main construction phase which is expected to take two years. It is expected to be fully operational by 2016-17. It is expected to provide an annual economic impact of AU$80M. A total of 16-20 train movements per day are expected into and out of the facility.

Vancouver

In the Vancouver area, Coast 2000 was built as a so-called inland terminal by the Vancouver Port Authority (VPA) and a local real estate developer, Modalink. The VPA subsequently sold its 50% share to Western Stevedoring in 2004. In actuality, this facility is really a transload facility, but it does facilitate a more efficient movement of containers in the Vancouver region by balancing out import and export moves and reducing the number of empty container moves. The area around Coast 2000 has emerged as a logistics park, with several major facilities, including HBC Logistics, Purolator and others. Because financing the project was so difficult initially, the HBC Logistics facility was built before the rest of the infrastructure was built. The initial design called for private roads to connect each facility and allow for seamless movement of containers from import facility to export facility. Another weakness is the lack of intermodal

rail service, even though rail tracks run through the middle of the facility. This would seem to be a major missed opportunity to relieve truck congestion in the Vancouver area.

In 2006, the BC Ministry of Transportation completed an inland terminal study.[11] It identified five key success factors:

- an adequate catchment area;
- availability of suitable land;
- reliable and competitive rail service;
- good access to a highway network; and
- phased development to limit initial capital investment.

According to this research, most European and North American inland terminals are predicated on import traffic, the fastest growing part of the market. Congestion at on-dock rail terminals in the Lower Mainland is viewed as the major challenge to system efficiency as is the imbalance in the supply of empty containers returning from the east to on-dock facilities, to be loaded with local exports at transload facilities. The development of a facility to 'rationalize" the handling of empty containers was seen as the best opportunity for the use of an inland terminal in the Lower Mainland.

The prime obstacle identified to obtaining rail service for an inland terminal was the potential impact on mainline rail operations. Two options were considered, an empty container terminal in the Lower mainland and an export transload-oriented terminal. Three size options ranging from 20-90 ha were considered, with costs ranging from $38M to $148M, exclusive of land costs. The smallest terminal would have capacity to handle 150,000 TEUs per annum. A site was picked at Matsqui Junction, about 72 km from existing transload warehouses. The location of the terminal made it uncompetitive with the existing system because of increased trucking costs.

However, it was determined that having a cluster of import distribution facilities located at the same location would vastly reduce the costs of drayage. Combining an inland terminal with an integrated

[11] BC Ministry of Transportation, "Inland Container Terminal Analysis, Final Report," IBI Group, 12 December 2006.

logistics park was also considered but a large land assembly in the Lower Mainland was thought to be very difficult and expensive, and it would be difficult to relocate several new facilities recently constructed. One conclusion was "more rapid expansion of container-handling facilities adjacent to the on-dock container terminals, may offer better efficiency and increased levels of service if it can be accomplished". The authors also considered the co-location of an inland terminal with an integrated logistics park to be a "best practice".

Halifax

In 2005, the Halifax Port Authority (HPA) and Halifax Regional Municipality (HRM) commissioned a study to evaluate the role that an inland terminal or truck access to the rail cut running through the Halifax peninsula could play in alleviating some of the challenges presented by trucking activity within the south end of the city.[12]

It was envisioned that all truck-related activities then carried out at CN's domestic intermodal terminal and the port's container terminals would be relocated to an inland terminal that would serve local and regional container markets. Similar to Auckland, the $60M terminal would have freed up land used for empty container storage, truck marshalling, gate processing and truck roadways on the existing terminals, thus increasing port capacity by as much as 250,000 TEUs, and postponing the need for a $300M third container terminal. (At the time, the port was handling about 525,000 TEUs).

The inland terminal would have become an expansion of the port terminals, but on property that was substantially less expensive to develop compared to waterfront areas. It would have also been located to provide ancillary business opportunities, particularly related to distribution and transload activities.

The inland terminal would have connected operationally with the port terminals by using dedicated rail shuttles, and sufficient captive rail cars would be used to ensure that at least 95% of import containers

[12] MariNova Consulting Ltd., "Halifax Inland Terminal and Trucking Options Study", Halifax Regional Municipality, January 2006.

destined for the local market, as well as repositioned empties, would be handled directly from ship to rail.

The project would have reduced truck traffic in the city and save wear and tear on local roads. It would also have reduced air pollution and Greenhouse Gases (GHGs) and there is also some potential to use hybrid locomotive technology for the shuttle operation.

The inland terminal would have increased the effective capacity of existing container terminals and postpone the need to construct a new terminal when the port reached capacity. The NIT also allows CN to move HIT and consolidate its volumes with NIT, leading to efficiencies. CN would also have the option to consolidate its Rockingham and Dartmouth yard activities at one location at some point in the future.

In 2007, the same study team was contracted to write a "Plan" for moving the project forward.[13] In the intervening two years, the port's competitive landscape had changed dramatically. The estimated capacity of the port was revised from 800,000 to 900,000 TEUs per year to 1.4M to 2M TEUs per year; this coupled with the lack of growth from 2005-07 pushed the point at which an inland terminal concept could be viable too far out into the future to be relevant. A more positive change from a port perspective, however, was that transload activity had started and was growing in Halifax. The original concept also began to meet some resistance from local neighbourhoods.

A new concept was therefore required to reduce/remove truck traffic from city streets. The "plan" that emerged focused on the opportunity to leverage growing transload activity to reduce truck traffic without increasing the overall cost of transportation, and actually *reduced* the cost of transload container delivery chain through the Port of Halifax. The "plan" was a much less expensive concept for a combination transload-and *rail driven* dry port / cargo village / distripark that would have taken advantage of existing rail infrastructure to link the

[13] MariNova Consulting Ltd., "Atlantic Gateway Distripark Plan", Halifax Regional Municipality, March 2008.

"dry port" and the port and build on the port's success in attracting transload and distribution business to the Halifax gateway.

The new concept was a hybrid combining the "close" dry port and the distripark in one location 18 kms from the port, at the north end of Burnside Industrial Park, adjacent to a proposed Transportation Node.

The concept was not a rail spur, but a distripark *terminal*. Initially, it was envisioned that CN (or a short line operator) would operate one rail shuttle per day with dedicated equipment in each direction, taking containers to and from both container terminals. From a sustainability standpoint, the concept used the 90 year old rail cut for *rail* traffic. The concept assumed using traditional diesel-electric locomotives assigned to service in Halifax, to avoid additional costs, but it also lent itself to the use of environmentally-friendly hybrid locomotives specifically for this service.

Under the scenario prevailing in 2007 (and today), import cargo that arrived at the port to be transloaded locally is picked up by truck and driven to a transload facility across the harbour in Dartmouth. The empty container is generally returned to the container terminal by truck. The same container is later picked up by truck and driven back through city streets to be positioned at a shipper's facility (usually outside the city) for loading export cargo. Finally, the loaded export container is trucked back through the city to the terminal for vessel loading. Thus, the container may make as many as four trips in the process. This situation is a result of different processes for import versus export cargo, as well as having a wide dispersion of facilities, which can add cost to the system. In the case of the loaded domestic container, it is either trucked back across the harbour to CN's domestic intermodal terminal or directly to central Canada by road. The "dry port" or distripark would reduce both the distance and time that these moves would take, thus reducing cost.

The concept was commercially-driven and provided a competitive alternative to trucking. It would have provided a less expensive delivery chain for transload containers than the prevailing system of trucking from Halterm and Ceres container terminals. The project required no diversion or building of new rail routes required, and it linked up with a proposed Expressway in Burnside Industrial Park

and other initiatives such as establishing an LCV depot. It also had the potential to consolidate two other CN facilities in the Halifax region, the domestic intermodal terminal and Dartmouth Yard. The basic concept is illustrated below:

Fig 1: Proposed Halifax “Dry port” or Distripark Site

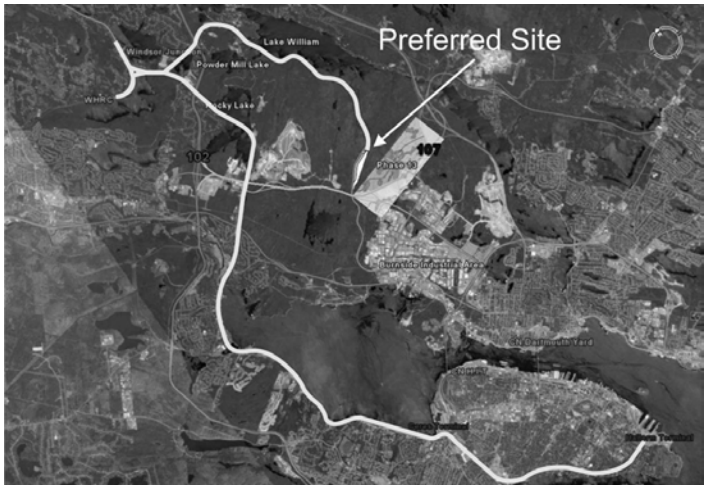
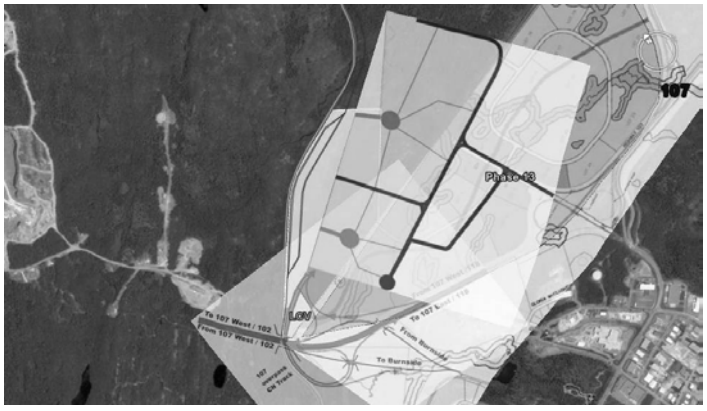


Fig. 2: Conceptual Layout of Halifax “dry port” or Distripark



The $15M Halifax “dry port” or distripark concept included nine (9) transload sites varying in size from 14-30 acres located to one side of the container facility. Each of the nine facilities was designed with normal public road access to their premises identified by the orange coloured road way above. Unlike the Vancouver facility described above, each operator would have had their own facility designed to their own specifications, based on their particular business.

Most importantly, each facility would have had access to a “back door” through their own back gate which would have allowed for the seamless movement of containers between the transload operator and the terminal facility, without access to public roads and. Traffic would also have moved between transload facilities as well, for maximum flexibility.

The terminal facility included a rail unload/load area for the shuttle train. In addition it had container empty storage areas as well as yard chassis for direct loading of containers to be moved around the distripark.

The train shuttle would have run with dedicated car sets, and a regularly scheduled run, just like a commuter train. Dedicated car sets would have ensured consistent capacity and availability as well as allowing for a reservation system to be put into place as necessary. The regularity of schedule, such as would be the case with a commuter train, would provide for operating reliability. The container facility would also include container repair, empty inspection, cleaning and services.

The value proposition was summarized as follows:

- it had the potential to reduce the impact of growing truck traffic on city streets;
- it could be commercially viable from an operating perspective;
- it was located in an industrial area that did not appear to have any significant negative environmental or neighbourhood impacts;
- it was consistent with the Port’s strategy to attract transload facilities to Halifax;

- it was compatible with the long term plans of the Burnside Industrial Park;
- it was a sustainable solution to the desire of HRM and many other stakeholders to reduce the numbers of trucks on Halifax Peninsula; and
- it used the *rail* cut for a *rail* shuttle.

The reaction to the plan was mixed, to say the least. Some thought it "brilliant" while port stakeholders were concerned about "double-handling" of containers. Instead of looking at the transportation chain from a holistic standpoint, each stakeholder looked at it through a very narrow lens. They did not consider the number of trips a container took through the city between the time it arrived and the time it departed, or the cost of those movements to the overall Halifax supply chain. A Phase III study that would have examined these costs in detail was not undertaken.

Instead, an alternative idea to convert the "rail cut" to an "Integrated Transportation Corridor" was examined.[14] The study examined many options for moving freight and local transit. Stakeholders reduced the options to four:

- two rail lines with a two lane, two-way road with rural drainage standards;
- as above, with urban drainage standards;
- one rail line and a two lane, two-way road with rural drainage standards; and
- as above, with urban drainage standards.

The order-of-magnitude cost estimates ranged from $205M to $270M, not including the cost of any land expropriation or the cost of replacing CN's many bridges spanning the existing rail cut. The preferred options amongst stakeholders were the two with urban drainage standards. The concept met with considerable local opposition, as it would have meant trucks running through backyards at the west end extremity, and much noise and pollution in the cut

[14] McCormick Rankin Corporation, "Integrated Transportation Corridor: Phase I Feasibility Study, Province of Nova Scotia, February 2009.

itself. A new community organization (Communities and Residents for Sustainable Transportation (www.cresthalifax.org) was established to monitor progress.

The latest chapter in this saga is an initiative to turn two city streets into one-way corridors north and south bound. In some respects, this revives a plan from the 1970s which would have seen a Harbour Expressway run from the south end container terminal and connect with Barrington Street at the Cogswell interchange. Some of the oldest buildings in Halifax would have been sacrificed in the process; the expressway was never built and the buildings were redeveloped as Historic Properties, a trendy enclave of boutiques and restaurants.

Conclusions

When the author was in Vancouver working on another assignment in early 2008, he interviewed a prominent player in western Canada's transportation industry. That person mentioned that one of the issues confronting the Vancouver Gateway is the "social license" of the Gateway. In other words, the "sustainability" of the gateway, whereby the movement of goods through to their final destination, whether Toronto or Montreal, was having a serious impact on the communities through which that cargo was moving, and the need to address these impacts was becoming imperative. Although on a much smaller scale, this same issue was becoming prevalent in Halifax and is prevalent in the other case studies presented here.

In terms of getting "buy-in" for the "dry port" concept in Canada, there are a number of conclusions that can be drawn from the experience of ports elsewhere:

1) Chronic congestion is required somewhere in the existing system to make the concept of an inland terminal work. The terminals in Auckland were developed to relieve highway congestion in the daytime.
2) A "dry port" or inland terminal appears to achieve better asset utilization for both ports and truckers. If a trucker can get four turns of his vehicle during the time that it once took him to do two, he has increased his productivity and asset utilization. Likewise, if an empty container move can become a full move, then this will improve productivity and remove vehicles from the

road. Ports and terminals get better asset utilization by freeing up space devoted to storage of import or export containers.

3) Shippers get better and quicker access to cargo. Shippers, particularly those in Auckland, get better access to their cargo because it is shuttled to a region close to where they are located. They avoid long queues getting into container terminals and highway congestion getting to and from the terminal.
4) In terms of the value proposition and 'selling' the concept, it is best to focus on the shippers and not the traditional transport community, i.e. the shipping lines or terminal operators. The traditional transport community will tend to baulk at doing things differently, so the potential operator should focus on the main beneficiaries, including stakeholders.
5) It helps to have the port and other partners invest in the project. As the Vancouver Port Authority demonstrated with the Coast 2000 project, as well as in Auckland, it helps to have the port authority act as a catalyst and provide both moral support and investment capital to get the project off the ground.

Because of its small market size, Halifax is viewed by many in the industry as a "discretionary" port. It serves the local market in Atlantic Canada, and has a small share of the Quebec, Ontario and U.S. mid-west market. Many shippers and shipping lines have become very conscious of their carbon footprints and their overall impact on the environment - Seattle has been marketing itself as "The Green Gateway". The development of "dry ports", using diesel electric hybrid rail shuttle technology, to reduce local container truck traffic, could give a "discretionary" port a marketing edge and lead to a more sustainable future for its residents.