This is a copy of a consultancy study undertaken for HITRANS by Pedersen Consulting in response to the Scottish Government’s consultation on the National Islands Plan.

The Brief
Pedersen Consulting was commissioned by HITRANS to examine and set out how the provision of ferry services can best contribute to the economic development, social well-being and sustainability of Scotland’s island communities as a contribution to the Scottish Government’s consultation in support of the development of the National Islands Plan.

Executive Summary
As a contribution to the Scottish Government’s consultation on the National Islands Plan, this study examines how the provision of ferry services can best contribute to the economic development, social well-being and sustainability of Scotland’s island communities.

Our island communities are dependent on sea transport for their social and economic sustainability. Most have suffered depopulation although in a number of cases there has been some recovery in recent decades.

The nine vehicle ferry operators to Scottish islands vary in numbers, types of vessels and styles of operation. Shorter and more frequent ferry crossings bring marked improvement in connectivity where this has occurred. This principle has not, however, been universally applied and a number of instances persist of unnecessarily long and infrequent services. This should be addressed.

While some operators are highly efficient, the open water vessels of state funded Clyde and Hebrides and NorthLink fleets exhibit poor productivity in terms of very high capital and operating costs to the public purse for a relatively indifferent service. In particular, high, but underused, passenger capacity requires large live-aboard crews which result in unnecessarily high cost. Likewise terminal design and operating methods have become ever more costly and labour intensive. Drawing on best practice in Norway, worldwide and in Scotland, more cost effective principles, including selection of short frequent routes operated by relatively simple vessels of moderate size operating to simple terminals can greatly improve productivity and reduce costs.

Island population growth can be enhanced by basing vessels at the islands they serve with their crews living ashore rather than on board ship. When accompanying families and economic multipliers are taken into account, island based crewing, would add a total of some 1,200 persons to the populations of the islands involved.
If ships crews are to be based on and live as part of island communities, accommodation will need to be created, an obvious consequence of population growth exacerbated by the purchase of existing housing as second or retirement homes from people outwith the area. Apart from the benefits of normalisation of crew's family lives, residence within the community will lead to more flexible manning of vessels and therefore to greater resilience of service.

The bigger the stake communities have in their ferry services the more likely these services are to be tailored to community needs. Community enterprises could be involved in provision crews’ accommodation, ferry land-side infrastructure such as terminals and, possibly in some cases, operation of ferry services.

The natural beauty and drama of island landscapes, seascapes and the distinctiveness of their built environments are fundamental to their communities’ sense of well-being, mental health and are key attractions to tourists. These amenities need to be protected from obtrusive and ugly ferry related infrastructure.

In terms of climate change, ferries are major emitters of CO2, but some such as Pentland Ferries and Western Ferries have been able to ameliorate such emissions. Hybrid (electro-diesel) ferries are expensive and have not so far proven to greatly reduce CO2 emitted. In the long run hydrogen fuel generated using peak sustainable electricity may offer the best CO2 reduction and elimination option.

The introduction on state funded services of RET (road equivalent tariff) in its current modified form, has stimulated traffic and economic activity within many island communities. It has not been uniformly applied, is a blunt instrument that brings in its train a number of problems and is very costly to the public purse. More sustainable focused market orientated fares for tourists, non-island residents and hauliers, coupled with reduced fares for all island residents regardless of who the operator might be, would enhance revenue, reduce subsidy, benefit island residents and could be introduced along the lines of the National Entitlement Card (bus pass).

There are many examples of good practice in the provision of island ferry services in terms of good connectivity, cost effectiveness, environmental amelioration and community engagement. If, however, the current policy of building large inefficient ships and overly complex terminals that diminish the natural and built environments of some of our islands persists and is rolled out further, the already high financial and environmental cost to the Scottish Government will be hugely disproportionate to any benefits and will abstract from funding that could go to financially strapped health and education services. If, on the other hand, policy is changed as recommended to adopt the more cost-effective and ‘greener’ practices, service frequencies and capacity would be enhanced, costs greatly reduced and island communities’ social and economic well-being would be improved.

To achieve the required shift in policy, a fundamental rethink of ferry policy and practice is required and should be undertaken by individuals or an entity familiar with best practice.

**Background**
The Scottish Government is currently undertaking a consultation to support the development of the National Islands Plan as set out in Part 2 of the Islands (Scotland) Act 2018. In fulfilling this brief, the Scottish Government want the National Islands Plan to build on what works well on Scottish islands, and addresses the challenges faced by islands and their communities.

Part 2 of the Act states that: “the purpose of preparing a national islands plan is to set out the main objectives and strategy of the Scottish Ministers in relation to improving outcomes for island communities that result from, or are contributed to by, the carrying out of functions of a public nature”. It goes on to exemplify the kinds of ‘improving outcomes for island communities’ sought, viz:

- Increasing population levels,
- Improving and promoting—
  - (i) sustainable economic development,
  - (ii) environmental wellbeing,
  - (iii) health and wellbeing, and
  - (iv) community empowerment,
- Improving transport services,
- Improving digital connectivity,
- Reducing fuel poverty,
- Ensuring effective management of the Scottish Crown Estate
- Enhancing biosecurity

The plan is required to list the public authorities that have duties under the Act. Among these is HITRANS.

In setting out their main objectives in the plan, the Scottish Ministers must consider and outline, in so far as is possible, what would be appropriate to use for the purpose of measuring (whether quantitatively or qualitatively) the extent to which outcomes for island communities identified in the plan are improved.

In terms of the outcome ‘improving transport services’, while it is recognised that ferries provide vital links between island communities and the Scottish mainland and in many cases between island and island, concerns have been expressed over the years, not least at the Scottish Government’s Expert Ferry Group, now reconstituted as the Ferry Industry Advisory Group, that in a number of cases ferry services are not as focused on supporting island economies or their social well-being as they could be.

This study sets out to examine how this state of affairs can be improved in a cost effective and environmentally sustainable way.

**Objectives**

Pedersen Consulting has, therefore, agreed to work with HITRANS and key contacts in examining how ferry services can better advance the economic development, social well-being and environmental sustainability of our island communities in ways that are practical and cost effective. The study will consider the following specific issues:
• Better connectivity between islands and with the Scottish mainland including onward landward links.
• Improving productivity of ferry services to contain costs while increasing capacity, frequency, revenue and overall convenience.
• Basing crews where possible on island communities served, thereby contributing to population growth, economy and social input.
• Options for housing crews and other ferry related personnel.
• Options for community ownership or control of ferry related assets.
• Considering more demand responsive and focused charging regimes that maximise revenue, e.g. from tourism, but offer reduced cost passage for island residents.
• How best to reduce environmental harm including the relationship between land and sea transport and alternative fuels.
• How best to preserve and improve island amenity in the face of increased traffic flows and economic development.

**Method**

Pedersen Consulting arranged to work in close co-operation with HITRANS to:

• Review available data on the National Islands Plan and existing ferry services.
• Consider options that address the issues set out in the proposal.
• Set out in outline, with specific practical examples, how these options can be implemented.
• Write and submit the report.

In carrying out the commission Pedersen Consulting agreed to liaise with Ranald Robertson and/or such other person(s) as HITRANS determined.

**Islands Characteristics**

Some 94 Scottish islands are permanently inhabited and their combined population is around 100,000. According to the 2011 census, the most populous at 21,031 is Lewis and Harris, also largest in area at 217.9 sq. km and in fact the next largest island of the British Isles after Great Britain and Ireland. Next in population of the Scottish islands are in descending order Mainland Shetland (18,765), Mainland Orkney (15,315), Skye (9,232) and Bute (7,228), each neatly representing the main archipelagos respectively of Outer Hebrides, Shetland, Orkney, Inner Hebrides and Clyde Islands. While the more populous islands with relatively diversified economies are able to sustain a fairly comprehensive range of health, social, educational and professional services within their bounds, the majority of islands with less than 1,000 people (less than a 100 in many cases) tend to have more limited local access to such facilities, requiring journeys off-island for medical and other services.

Sustaining and where possible increasing population will, therefore, be an important factor in the securing the viability of such local services as can be provided within these communities.

It is worth noting the total population carried by Scottish islands today is considerably less than a century and a half ago. At their lowest level in the 1970s the Hebrides and Northern Isles populations were about half the former figure although there has
been some recovery in recent decades. It is interesting, however, that over a similar period the population of the Faroe Islands increased by about six fold. While the reasons for such a divergence in population trends are instructive, they not considered here, but will no doubt be deliberated upon by others in preparing the National Islands Plan. Of course the picture in Scotland varies from island to island. Some smaller islands continue to lose people; Ulva’s population declined from 859 in 1851 to seven today. Some others, like Eigg and Gigha, which had suffered severe depopulation in the past, have recently shown remarkable economic and social regeneration and population recovery following the community purchase of their land from former private owners.

To varying degrees as between one island and another, traditional industries of farming or crofting, fisheries, distilling, weaving and knitting continue to be significant. Tourism, however, particularly cultural and wild-life tourism, has grown disproportionately and has in some cases stretched local infrastructure and services. Other sectors that are important in some islands are energy, both hydrocarbons and increasingly renewables and small scale manufacturing of high value items such as jewellery and cosmetics.

**Connectivity**

No Scottish island is self-sufficient. Some form of connection with the outside world is essential if island life and economies are to be maintained at all. Although air transport has a role in a number of circumstances, boats and ships have from time immemorial been the normal means of passage for both people and goods to and from the mainland or neighbouring islands.

Until a couple of generations ago, our main islands were served by passenger/cargo mail steamers operating from railheads or regional centres and often making multiple calls en route at island ports, in some cases daily, in other cases two or three times a week. Cars, mail and other goods were loaded by derrick or precariously over planks at suitable states of tide. Heavier freight flows were handled by regular multi-port cargo services, operating from Glasgow for the Hebrides and Leith and Aberdeen for the Northern Isles. This long established mode of operation was replaced in the 1970s and ‘80s by the RO-RO (roll on roll off) revolution, whereby cars and goods vehicles were driven directly on to the ship’s main deck, thereby dispensing with the slow and cumbersome use of derricks or planks. The vehicle ferry became in effect a sort of floating bridge linking the mainland road network with the island roads.

In the case of some islands with few residents, the community provides its own boats to cover its main needs, chartering specialist craft on an occasional basis to deliver heavy or unusual loads. The more populous islands are currently served by some 50 plus vehicle ferry routes involving some 70 plus dual passenger/vehicle ferries run by nine operators. In addition to these vehicle ferry connections a number of passenger only services operate. The majority of ferry services are subsidised either directly by the Scottish Government or by local authorities, although some operate profitably and without subsidy.

**The Short Crossing Principle**

Whereas a vehicle travelling on a road is unimpeded by the time at which a journey can be undertaken, a ferry crossing presents a constraint on the number and timing
of travel opportunities available as well as an additional time and cost penalty. A ferry operates at about a third the speed of a road vehicle and may cost up to ten times the operating cost per vehicle carried as a vehicle running on an equivalent length of road. This overall effect is known as the ‘impedance’ factor which accounts for the tendency to replace long multi-port steamer services with roads and shorter ferry crossings.

In 1973 the then Zetland (Shetland) County Council, inspired by Norwegian practice, replaced the thrice weekly multi-port mail ship Earl of Zetland and revolutionised inter-island connectivity by instituting short, frequent and cheap RO-RO ferry crossings operating from early till late. In this way Yell, for example became a land-bridge between Unst and the Shetland Mainland.

Another example was the replacement of the daily Mallaig-Kyle-Raasay-Portree mail ship with short frequent ferry crossings at Mallaig-Armadale, Kyle-Kyelakin and Sconsar-Raasay. The Kyle-Kyelakin ferry itself was replaced by the famous Skye Bridge in 1995 and, after tolls had been removed, thereby eliminating the ferry impedance effect completely. That bridge is one of 23 fixed links that have replaced ferries in Scotland since the outbreak of the Second Word War.

Thus, leaving aside future opportunities to create fixed links, the selection of a short ferry crossing in place of a long one has the multiple benefits of increased frequency, increased capacity, reduced passage time, reduced overall journey time and reduced cost, in other words reduced impedance. Reduced impedance translates into better connectivity and therefore a better range of travel opportunities. To illustrate the point: if a 30 mile (two hour) crossing can be replaced by a (one hour) passage of 15 miles, a ferry would be able to make five or six round trips per day instead of say three. It follows that to carry the same volume of traffic a ship of roughly half the size and therefore roughly half the operating costs is required. Where implemented the effect of increased frequency coupled with reduced charges always generates new traffic and a requirement for increased capacity. It is in the generation of new traffic that lies the scope for growth in island economies.

So, nowadays the predominant mode of island connectivity is a ferry, whether for passengers, vehicles or both. Most general goods to and from islands are consigned by ferry in commercial vehicles. In addition, the shipping of fuel and other commodities such as salt, lime, etc. or unusual loads are handled by bulk carriers or other specialist vessels.
**Route and Vessel Characteristics**

Routes and vessels vary greatly in magnitude, frequency of operation and productivity, but for the reasons explained above, shorter and more frequent routes generate more traffic and require less subsidy than long and infrequent ones.

The longest passage (337 km) at 12 hours or more is that operated nightly between Aberdeen and Lerwick (Shetland) by Serco NorthLink’s vessels Hjaltland and Hrossey which at 125 metres and 21.6 MW power are in turn the largest and most powerful ferries operating on a Scottish islands service. This route is also the most heavily subsidised at some £40,000 per single crossing and the most polluting in terms of CO2 emissions, which see later.

At the other end of the scale are a number of very short frequent passages, some of less than a kilometre and around five minute’s passage time, such as CalMac’s Ferries Colintraive –Rubodach (Bute) vehicle ferry service where the subsidy is about £40 per single crossing. Indeed Highland Council’s Corran ferry, Scotland’s second busiest, covers its operating costs from revenue. For the short hop to Ulva for the island’s seven inhabitants, an small open motor boat provides the connection for passengers (mainly day visitors) and parcels, supplemented as required by a dumb barge for conveying heavy items. There is no subsidy for this operation.

The change to shorter and more frequent ferry crossings described above, and the marked improvement in connectivity that this has brought about, has not been universally applied. There are a number of instances where long and infrequent services perpetuate something of the old mail ship mentality. Examples include Islay, Coll and Tiree, Barra and Stromness-Scrabster. While the connections between Uig and respectively Tarbert Harris and Lochmaddy North Uist are relatively short, the schedules are infrequent, irregular and inconvenient because one vessel MV Hebrides operates alternately to serve Harris and North Uist. Connectivity on some other relatively short routes is constrained by the use of one large ship where two or more smaller more economical vessels could provide a more flexible and frequent service. A further impediment to connectivity is that most Scottish ferry services cease operation in the early evening, constrained by crew working hour’s regulations which further reduces useful travel opportunities. In essence the key to improving connectivity is greater frequency, reduced overall journey time and reasonable fare levels.

In the light of the above, connectivity can be enhanced significantly in terms of frequency, capacity, traffic and, therefore, revenue, where it is feasible to select shorter crossings and in some cases use intermediate islands as land-bridges. Examples of how this can be done have been tabled at the Expert Ferry Group/Ferry Industry Advisory Group¹. In summary they are:

- **Arran** – a more frequent two or three ship service to allow commuting
- **Islay & Jura** – Phase 1: using Jura as a land bridge for light vehicles with supplementary long route freight ferry
- **Colonsay** – using a dedicated vessel of appropriate capacity

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¹ West Coast Ferries Shaping Change, R Pedersen, HITRANS, 2016
• Mull – a frequent two ship Oban-Craignure vehicle ferry service with supplementary seasonal fast passenger ferry
• Coll & Tiree – combining a direct Oban link with a midday connection via Tobermory and the Mull land-bridge
• Barra – combining a direct Oban link with an alternative connection via Tobermory and the Mull land-bridge
• Lochmaddy-Uig & Tarbert (Harris)-Uig – utilising two vessels to give much enhanced frequency, regularity and convenience
• Lewis – operating a two ship service to increase frequency and resilience
• Orkney – shortening the Gills Bay route by making Burwick available as Orkney landfall
• Shetland – replace current Hjaltland and Hrossey with more efficient high capacity vessels and provided a supplementary seasonal daily Shetland-Orkney return connection

Details of a number of suggested schedules and alternatives are also provided in the paper, West Coast Ferries, Shaping Change, HITRANS, 2016. In the case of two of the above examples, whereby Tobermory would be used as island landfall on certain sailings to/from Coll/Tiree and Barra, not only would frequency be increased and inter island connectivity improved, but Tobermory would retrieve its former role as a sub-regional centre. Portree could also have an enhanced sub-regional role if more frequent Uig-Tarbert and Lochmaddy services were instituted as recommended.

The aim in setting out the above options is that, compared with current practice, ferry connections should, depending on geographical circumstance, seek to fulfil as many as possible of the following hierarchical scale of available travel options:

1. Daily access to and from main Scottish centres without the need for overnight stay en route
2. Day return access to a regional centre with adequate time for business or social purposes
3. Timings convenient to hauliers for import of supplies and export of products
4. Timings useful to tourists to maximise visitor spend in the communities served
5. Daily commuting in either direction where distances are short
6. Evening travel to extend access opportunities in either direction for business and social purposes

At present some ferry services do not permit any of these travel options.

**Landward Connections**
A ferry is not an end in itself, but is invariably one link in a longer journey on the mainland and often on the island too. Traditionally many mail steamer services ran in connection with trains at railheads where the train delivered passengers virtually alongside the ship. Such railheads were more numerous in the past, but a number are still in operation to connect Glasgow and intermediate points with ferries to and from Rothesay (Bute) via Weymss Bay, Brodick (Arran) via Ardrossan, Craignure (Mull), Lismore, Coll, Tiree and Barra via Oban and Armadale (Skye) and Lochboisdale (South Uist) via Mallaig. In addition to these connections, a short road connection links the railway station at Thurso with Scrabster and thence by ferry to Stromness (Orkney).
It has to be said that the interchange between train and ferry is not always as well-timed as formerly. For example Arran timings were 45 minutes faster the Edwardian period as illustrated:

1901

Glasgow St Enoch (train)  dep 09:10  
Ardrossan (Steamer)       dep 10:00  
Brodick                  arr 10:33

2019

Glasgow Central (train)   dep 11:18  
Ardrossan (ferry)         dep 12:30  
Brodick                  arr 13:25

Where rail connections are not available or are otherwise inadequate, a number of scheduled coach routes link mainland centres with ferries. For example coaches leave Glasgow going north at 06:45 and 10:00 to link with the 14:10 and 18:30 ferry sailings on alternate days for arrival at Tarbert (Harris) and Lochmaddy (North Uist) at 15:50 and 20:10 respectively. Equivalent southbound services are also provided for the ten hour journey. An Inverness connection is also provided by changing coach at Portree or Invergarry. There are other mainland coach links at Kennacraig for Islay, Tayinloan for Gigha, and for various ferry connections at Oban, Corran, Mallaig, Ullapool (for Stronoway), Scrabster, Gills Bay and John o’ Groats (For Orkney).

On several of the larger islands, local bus services connect with ferries, such that it is possible to travel between mainland centres and rural island locations all the way by public transport, lengthy though some of these journeys may be, involving change of mode between coach and ferry and ferry and bus or vice versa.

In some of the instances where a land-bridge solution can be instigated, for example on Jura or Mull, it would become economic to run a coach all the way without passenger having to transfer their luggage between one mode and another, in the case of Jura between Port Ellen on Islay to Glasgow via two short ferry links to provide a faster, more frequent and less environmentally damaging service than the current service via Kennacraig. Likewise a through coach connecting at Tobermory with ferries from Coll, Tiree and Barra, could run all the way to and from Glasgow via a frequent Craignure-Oban ferry.

The process of moving from the present style of ferry operation to that recommended will take time and will be undertaken in stages, thereby contributing to the Islands Plan ‘improving objective’ of ‘improving transport services’.
Productivity
Between the extremes outlined above, vessel types engaged on Scottish island ferry services can be categorised as follows:

1. Large open-water European Class B vessels operating to linkspans and generally embarking passengers to the side.
2. Smaller, usually double ended, vessels loading cars and passengers over slipways, either end-on or over the quarter.
3. Vessels of the Norwegian type operating to lock-on linkspans as operated by Shetland Islands Council and Western Ferries.
4. There are other variants, such as MV Loch Nevis that operates to both slipways and linkspans, vessels of the type (1) above, but restricted to partially sheltered waters, passenger only craft and freighters that carry no or not more than 12 passengers.

On most vehicle ferry routes, the ratio of passengers carried to cars is around three or four to one, but the ratio of passenger capacity to cars on most open-water Class B vessels as operated by CalMac Ferries is around seven to one. This means that passenger accommodation is generally spread over two decks rather than one which reduces deadweight (payload) and adds to capital cost and the complexity of evacuation in emergency. As crew numbers are largely proportional to passenger capacity and the requirements of vessel evacuation, such extra unutilised passenger capacity, therefore, necessitates large crew numbers (typically around 30). Crew are invariably required to live-on-board even where the route is relatively short. Provision of crew accommodation further increases the requirement for deck space which further increases capital and operating costs and can impede vessel manœuvrability due to the windage created by excessive top hamper. Productivity is further diminished by design of terminal currently in use by these vessels, which is labour intensive, costly in terms of capital and running costs and slows berthing.

The long-standing recommendation² to replace the inconvenient and capacity constrained one ship service operated by MV Hebrides between Uig and alternately Tarbert (Harris) and Lochmaddy (North Uist) by two simpler ships of circa 350 summer, 250 winter passenger and 80 car capacity each dedicated to Harris and North Uist respectively would revolutionise access to both islands. It comes as a surprise that Transport Scotland intend to replace Hebrides with the phenomenally expensive 130 car hull 802 currently building with a passenger capacity of 1,000. Bearing in mind that the number of passengers carried on any sailing is never thought to have exceeded 300, this the single ship operation will do nothing at all to improve the currently poor connectivity.

Another productivity issue is that full meal catering is provided on several relatively short routes, which, apart from the cost of provision, which must be well in excess of earnings, it abstracts from the income of land based businesses. To obviate these drawbacks, catering on shorter crossings, if offered at all, should be limited to a basic coffee and biscuit type provision.

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² Little Minch Ferry Options, R Pedersen, HITRANS, 2017
These and other characteristics mean the cost of Scottish Government subventions in support of CalMac’s and NorthLink’s services has increased exponentially to levels among the highest per passenger mile in the world. Yet frequencies of service tend to be low and schedules tend not to maximise community benefit. Such poor levels of productivity compared with best industry practice, means that public funds are diverted from say struggling health or education services to supporting inefficient ferries.

In considering some pointers as to how matters might be improved, a paper was presented to the Scottish Government’s Expert Ferry Group on Scandinavian/Scottish Ferry Comparisons on October 2015. The paper described how Norwegian ferry links are provided in terms of policy, vessel and terminal design and operating practices, such that the publically funded Norwegian approach is significantly more cost effective than that pertaining in the Scottish state funded ferry sector. The Norwegian approach is to regard ferries as part of the road system, select the shortest feasible route, employing simple economical vessels with small crews living ashore, working in shifts to provide frequent services from early until late operating to “lock-on” linkspans which require no shore-side personnel and minimal on board personnel to operate.

As mentioned above, Shetland Islands Council and Western Ferries adopted such policies and provide thereby superior frequent early till late connectivity to the communities they serve. Although Western Ferries does not operate to an island as such, it operates profitably and without subvention of public funds. The ‘live-ashore’ crews are much fewer in number on vessels running to slipways, which results in much lower capital and running costs than the large class B open water vessels.

One interesting example of Class B open water service that echoes something of the Scandinavian approach is Pentland Ferries catamaran Pentalina operating across the Pentland Firth between Gills Bay (Caithness) and St Margaret’s Hope (Orkney) with, 10-12 live ashore crew. Pentalina has been able to operate a reliable service for the last decade at about a third of the capital and operating costs of an equivalent monohull as operated by CalMac or NorthLink, such that she has been able to run profitably without any subvention of public funds, whereas the parallel longer, less frequent and less patronised NorthLink service operated by Hamnavoe with 28 live-aboard crew and requires a subsidy of an estimated £10 million annually.

In the light of the above, future options for improved and more cost effective operations, should draw on Norwegian ferry policy in terms of simpler vessels, terminal and operating practices whereby ferries as an integral part of the road system, provide frequent crossings on the shortest feasible route, with small crews living ashore, working in shifts and operating to “lock-on” or similar linkspans which require no shore-side personnel and minimal on board personnel to operate.

As the large ship, Class B open-water routes incur by far the greatest costs, it will be important to employ more economical vessels, with more vehicle space in proportion to passengers. In seeking shorter more frequent connections to increase capacity and reduce unit costs, opportunities should be taken to adopt the land-bridge principle where appropriate while upgrading roads and land transport connections to accelerate overall journey times.
Improving productivity as described above and freeing up funds for vital health and education services would contribute to the Islands Plan ‘improving objective’ of ‘improving and promoting sustainable economic development’.

Island Based Crews
As noted in the previous chapter, crews live aboard the larger publicly funded Class B open water vessels and a few others of the Scottish island ferry fleets. It has long been argued that it would be more beneficial to island economies, and more family friendly, if crews were shore based, and lived in the island communities they serve. It was something of a shock to discover that of the crew of MV Finlaggan on the Islay service, not one of the officers or ratings were Islay residents. This may perhaps be an extreme example. It is understood, however, that while a number of islanders are employed on these vessels, they are in a minority.

Crews do live ashore in the cases of the smaller Loch Class vessels of the CalMac fleet, the various council operated short crossing ferries, including the Shetland Islands Council fleet, Western Ferries fleet and Pentland Ferries Class B vessel(s). In these cases crews and their families contribute to their communities by using local shops and services and maintaining school pupil numbers.

As crews generally work fortnight on/fortnight off with up to ten weeks annual leave in addition, each ship requires two and a half times the on-board complement to maintain regular operation. The total number of such personnel is some 1,130, representing a total annual wage bill of perhaps £50 million to which should be added the cost of on-board catering and accommodation. Only a tiny proportion of these funds finds its way into the economies of the islands served.

By basing vessels of simpler design with lower passenger to car ratios and average crewing of say 12 to 20 on several of the islands served and arranging for the crews to live ashore on those same islands, a very considerable contribution could be made by these personnel and their families to the local economy and community life. Because of lack of shelter, it will not always be possible for some of these larger vessels to be based overnight at an island port, but a number of possibilities have been identified, subject in some cases to port improvement or development.

These ports are listed below together with estimated crew numbers and accompanying family members involved:

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<th>Crew Comp</th>
<th>Total Crew</th>
<th>Family</th>
<th>Total</th>
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<td>100</td>
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<td>1305</td>
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</tbody>
</table>

The values indicated are best estimates and will be subject to refinement, but the 500 plus potential island based crews amount to a wage bill of some £25 million. As there would be opportunities also to victual and bunker the vessels locally, a substantial financial contribution would be injected into island economies, an injection that is largely not currently available. Assuming half the above crew members have families of one partner plus the national average of 1.9 children, then the introduction of island based crewing implies the on-island location of 1,300 persons. As some islanders are already employed on ships with live-aboard accommodation, then to calculate the additional island population increase attributable to shore based crewing, the total should be reduced by an estimated 40%, bringing the revised total to around 800. That is to say 800 additional island residents attributable directly to island based crewing of vessels on services that were formerly undertaken by ships with live-aboard crews.

It is beyond the scope of this short study to calculate the economic multiplier effect of these additional jobs and residents in detail, but as a broad indicator a conservative multiplier of 1.3 would suggest a further 230 jobs created, which, when associated families are added, results in some 390 residents additional to crews and their families.

Thus when all these factors are taken into account, island based crewing, on the basis described above, would add a total of some 1,200 persons to the populations of the islands involved. On Barra, for example, the effect would be a 10% population increase.

The implementation of a shore-based crew policy will require to be introduced in stages as new more cost-effective vessels are built and routes re-configured. For any particular island, crews will have to be recruited locally and trained or relocated to the island as older personnel retire. They will also have to be accommodated on each island brought within the scheme.

**Shore-based crewing on the islands served would be a contributor to the Islands Plan ‘improving objective’ of ‘increasing population levels’**.

**Accommodation**

Clearly if ships crews are to be based on and live as part of island communities, they will need to be housed. In fact addressing the Islands Plan ‘improving objective’ of ‘increasing population levels’ has the obvious consequence that island housing stock will have to be increased to accommodate the increased number of inhabitants. The need for additional affordable housing to buy or rent for residents is exacerbated on
many island communities by the purchase of existing housing as second or retirement homes from people outwith the area, which has made it difficult or impossible for local people to secure a home at an affordable price.

In the past, it has not been unusual in sparsely populated locations, when new developments have been planned, for housing and/or special accommodation to be factored into the development. Examples include Dounreay, Corpach, Invergordon, Sullom Voe, etc. With the introduction of shore-based crews, the numbers of individuals and their accommodation requirements on any one island will be much less than with those substantial developments. Nevertheless they and their families will have to be housed. There are three options.

1. Island residents who are already employed on and on-board ship basis will presumably already have their own housing.
2. Island residents who may be recruited and trained may likewise also already have local accommodation although they and/or in the case of (1) above may seek an upgrade.
3. Crews recruited or relocated from elsewhere will require to be housed. This can be provided in the form of an accommodation block that can later be converted to tourist accommodation and/or new housing for rent or sale can be built and provided. The capital cost of these outlays would form part of the overall project cost, although rents and/or sales would be revenue to the project.

It goes without saying that such new accommodation as is provided should be to high standards of insulation and design. Ideally such accommodation should be as close to the ferry terminal as feasible to reduce travel to work time, cost and environmental impact.

The major benefit of crews and their families living ashore on the island that they serve is that they will then be part of community life; they will shop in the local shops, their children will attend the local school and the families will have the opportunity to participate in the social activities of the community, creating a bond between crews and community that is at times absent at present.

**More Flexible Vessel Operation**

Apart from the positive benefits of normalisation of crew’s family lives, residence within the community will lead to more flexible manning of vessels and therefore to greater resilience of service. For example, whereas a vessel with a live-aboard crew is limited in its operating hours by working hour’s regulations, this need not be the case with shore based crews. If the locally based vessel is required by virtue of traffic demand or weather interruption to make additional sailings beyond normal hours, a crew will be at hand ashore to operate a second shift. Indeed, if it is considered desirable to operate the islands ferry service for longer hours in the day on a regular basis, then a two shift system is perfectly feasible, so long as a sufficient number of personnel are employed, as has been the case for many decades for ferries operated by Shetland Islands Council and Western Ferries. In this way the asset, the vessel, can easily be sweated to increase capacity and travel opportunities in a way that is not normally possible with a live-aboard crew.
Community Ownership or Control
The bigger the stake communities have in their ferry services the more likely these services are to be tailored to community needs. One important step in this direction will of course be the move to house crews in the island communities they serve as described above. There are, however, other aspects of community involvement that may have relevance to the ferry sector.

In the late 1970s, against a climate of widespread scepticism, the Highlands and Islands Development Board (HIDB) launched its then speculative Community Co-operative Scheme, a self-help initiative whereby communities were encouraged and assisted to create businesses on islands and other rural areas where enterprise had theretofore been under developed. Sceptics were confounded and the scheme was a success, such that over the ensuing decades, a multitude of viable community enterprises were created throughout the Highland and Islands, culminating in the community land ownership movement.

Several island communities have bought out their island estates or part thereof from their former private proprietors. While this is no guarantee of a brighter future, the results so far have been promising and in some cases quite transformational. Since community buy out, the inhabitants of Eigg and Gigha, for example, have been able to build new homes where the existing stock had been sub-standard and have been able to set up businesses, where this had in some cases previously been forbidden. Community electricity grids have been established using green energy and other amenities have been created or improved. As a consequence of these initiatives, families have been encouraged to stay on the islands where formerly out-migration was a favoured option, others have moved in, as a result of which the island populations have grown in number and in confidence and with this the school rolls have swelled.

In this climate of enterprise, it is not inconceivable that island communities could if desired take ownership and control of some of their ferry related assets. One obvious opportunity could be provision of housing or other accommodation for ferry crews as alluded to in the previous chapter. In taking such an initiative forward, it would be important to remove much of the ‘red tape’ that currently inhibits such developments. It may also be feasible to extend this concept further to include operational aspects of the ferry sector such as some of the terminals themselves.

To focus on one practical possibility, there has been much local debate on Mull about the future of the Oban-Craignure ferry service and the need to upgrade Craignure pier. Mull Community Council and others were extremely worried about a costly £78 million proposal to enlarge the terminal to take a proposed very large vessel which, if utilised, would at a stroke deposit up to 130 cars in one go on Mull’s fragile road network. The second concern was the proposed construction of a wholly out-of-scale and unnecessary marshalling area and terminal building designed to handle 1,500 persons (over half the Mull population).

The alternative discussed was a more frequent service operated by two (or three) basic vessels of moderate size operating to the terminal as currently configured, albeit refurbished as necessary. This solution, while of lower capital and operating
cost, would enable commuting, increase capacity and would be completely self-contained with built in resilience in the event of breakdown. Craignure pier is currently in the ownership of Argyll and Bute Council and has received little investment in recent decades. Transfer of the asset to the community with assistance from the Scottish Land Fund and Highland and islands Enterprise could, if the Mull community were so motivated, provide a viable community enterprise, while better aligning its development and use to local needs.

While the operation of large ferries by communities may be too ambitious an aim for many island communities at present, this could be a longer term possibility.

Community ownership or control of ferry related assets would be a contributor to the Islands Plan ‘improving objective’ of ‘improving or promoting community empowerment’.

Environmental Solutions
Environmental issues with regard to ferries and the Islands Plan can be considered from two perspectives. These are island landscape and amenity and the wider issue of climate change.

Landscape and Amenity
For most of our islands the natural beauty and drama of their landscapes, seascapes and the distinctiveness of their built environments are not only fundamental to their communities’ sense of well-being and mental health, but are key components of their attraction to tourists. The social and economic value of these assets are, therefore, almost beyond price.

Bearing in mind the increasing pressures of tourism in recent years, other developments and the need for transport infrastructure to cope with increased demand, it will be most important to conserve and enhance the quality of islands’ natural and built environments. In practical terms this will demand carefully considered planning, a code for well-mannered architecture and care taken that transport infrastructure is as unobtrusive as possible. Where ferry related infrastructure does of necessity obtrude, such as ferry terminals, parking and marshalling areas, offices, waiting rooms and associated roads, every effort should be made meld these into the existing landscape in as elegant a manner as possible, enhanced and softened by well-thought-through landscaping and tree planting.

Recent £30 million terminal developments at Brodick, Arran, are an example of falling well short of this objective. The new pier is untenable in certain wind conditions. The large two storey terminal building is unsightly, more suited to an urban industrial estate than a rural island setting and made worse visually by a lengthy and unreliable walkway between the upper level of the terminal building and ship’s side. The increased size of the new and phenomenally expensive ferry Glen Sannox, has necessitated a larger marshalling area, further diminishing the visual amenity of Brodick’s otherwise idyllic waterfront.

The employment of say two smaller simpler vessels in place of one large vessel, as described in previous chapters, operating to simpler terminals and embarking passengers over the linkspan, rather than by walkways to the ships’ side will obviate
such adverse visual impact and will also have the multiple advantages of increased frequency, greater capacity, increased revenue, less pressure of traffic surges on island roads and, assuming efficient ship design, less fuel burn per unit carried. In fact well-selected ship design can have an important influence on mitigating environmental harm even before novel fuel options are considered.

**Climate Change**

One of the main and immediately available technological advances that can improve vessel environmental performance (and also address the chronically poor productivity of much of the increasingly obsolete monohull ferry fleet) is the medium speed steel hulled catamaran. The superiority of the catamaran is demonstrated in a paper by Professor Baird tabled at the Cancun Inter-ferry Conference. A number of misapprehensions persist with regard to deadweight (payload), sea keeping and other issues. However, the catamaran *Pentalina*, operated by Pentland Ferries, a relatively small vessel of 70 metres length, regularly carries nine laden trailers, plus some 30 cars and in excess of 100 passengers per crossing with great reliability over one of Scotland’s roughest passages and requiring half the power and crew of an equivalent monohull to undertake this task. In so doing, and without public subsidy, *Pentalina* with her shorter route, while carrying more traffic, notwithstanding less deadweight, emits one fifth the CO2 emissions than the competing heavily subsidised service operated by NorthLink’s *Hamnavoe* as demonstrated in the table below:

<table>
<thead>
<tr>
<th></th>
<th><em>Hamnavoe</em>, Northlink</th>
<th><em>Pentalina</em>, Pentland Ferries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deadweight</td>
<td>Approx. 1,000 t</td>
<td>475 t</td>
</tr>
<tr>
<td>Commercial vehicle carryings</td>
<td>5500</td>
<td>7500</td>
</tr>
<tr>
<td>Annual return journeys</td>
<td>Approx 850</td>
<td>Approx 1090</td>
</tr>
<tr>
<td>Crossing Time</td>
<td>1.5 hrs</td>
<td>1 hr</td>
</tr>
<tr>
<td>Fuel consumption per return</td>
<td>Approx 4,000 litres</td>
<td>Approx 850 litres</td>
</tr>
<tr>
<td>Crew</td>
<td>28</td>
<td>12</td>
</tr>
</tbody>
</table>

An even more telling contrast was demonstrated in a prizewinning report\(^3\) of 2012 in which total journey emission were compared for passengers, cars and commercial vehicles travelling between Edinburgh and Orkney by three alternative routes. The CO2 emitted per car for each route was as follows:

Edinburgh-Aberdeen (by road) thence Aberdeen-Orkney (by ferry) = 687 kg CO2/unit
Edinburgh-Scrabster (by road) thence Scrabster-Orkney (by ferry) = 196 kg CP2/unit
Edinburgh-Gill Bay (by road) thence Gills-bay-Orkney (by ferry) = 93 kg CO2/unit

Thus it has been shown that driving a car from Edinburgh to Gills Bay and crossing by *Pentalina* to St Margaret’s Hope emitted half the emissions compared with driving to Scrabster and crossing by *Hamnavoe* to Stromness, and one seventh the emissions compared with driving to Aberdeen and taking passage on *Hjaltland*

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\(^3\) Policy Implications of CO2 Emissions for Island Ferry Services, A Baird, Transport Reseach Institute, napier University and Pedersen Consulting, 2016
Similar results were revealed for Commercial vehicles and for overland travel by bus or train. This clearly demonstrates that combining short ferry crossings with longer road journeys is environmentally less damaging than long ferry passages. It should be noted that Hjaltland and Hrosey are particularly inefficient carriers in terms of lane metres per installed power. Multi-deck ships of more modern design but of similar power would have some four time the lane metrage, thereby reducing to a quarter CO2 emissions per unit carried, would be more economic in operation and would require less subsidy.

With the drive for a carbon neutral future, there is currently a good deal of speculation about innovations on road transport, electric and driverless cars being high on the agenda. At the turn of the 20th century, one third of all automobiles in use were battery electric. Since then, however, the technology failed to be adopted, other than for specialised uses because of cost, poor range and slow battery charging. More recently, improvements in battery technology have increased the practicability of battery electric cars and ferries. Remaining downsides are cost and the dependence on the democratic Republic of Congo (with its appalling labour conditions) as the main source of the cobalt necessary to recharge lithium batteries. Graphene, however, may yet revolutionise battery technology in terms of range and fast charging and may at some point have relevance for ferries. For the present, however, battery weight is a major factor with electric vessels with 4MW power needing well over 100 tonnes of batteries which significantly reduces deadweight by around a third. It is telling that CMAL’s recently introduced hybrid electro-diesel 23 car capacity ferries consume some 4 litres of diesel fuel per passage hour per car space, whereas for the conventional diesel 40 car capacity Western Ferries’ vessels, with their efficient hull design, the figure is less than 2 litres of diesel fuel per passage hour per car space. When it is realised that the Western Ferries vessels were built for about one third the cost of the hybrid vessels, there is a case, for the present, for utilising efficient diesel technology together with proficient hull design until such time as electric technology is more mature.

While issues remain with battery electric transport, a viable alternative is emerging, namely, green hydrogen, which can be made from two ingredients that Scotland has in abundance. These are water and electricity generated either from wind turbines or increasingly from tidal stream turbines. Scotland’s potential for tidal steam energy in particular is enormous and ultimately much greater than our current electricity requirement. By stripping out tidal peaks and other surplus wind generation from base load, to electrolyse water, “green” hydrogen can be generated at marginal cost. Such hydrogen can readily be utilised as both an automotive and marine fuel either through fuel cells to drive electric motors or directly in conventional internal combustion engines. Either way the only emission is water vapour which will end up in the sea from whence it came. No need for large batteries. Several countries, such as Iceland, Norway and Canada are investing heavily in this technology. Scotland should do likewise.

How driverless cars or car sharing may effect ferry travel is difficult to predict. Bearing in mind that most Scottish ferries operate in rural areas of scant public transport, the car is an essential component of daily life. Likewise the lorry and van are the universal freight movers. It is difficult to see any significant change in this pattern in the foreseeable future.
Ensuring that ferry related assets conserve and enhance the quality of islands’ natural and built environments and that CO2 reduction measures are adopted on ferries would be contributors to the Islands Plan ‘improving objective’ of ‘improving or promoting environmental well-being’.

Charges and Revenue
Ferry fares have been a matter of debate in Scotland for many decades. In 1961 the Highland Panel recommended that charges to remote mainland centres (e.g. Thurso) should be used as a yardstick for determining sea service charges. This concept came to be known as the “mainland comparison”. Pressure from the Panel in promoting this and other ideas resulted in the Government of the day setting up the Highland Transport Board under the chairmanship of Lord John Cameron. In considering the “mainland comparison” concept, the Board recommended that “for the purpose of deciding the need for subsidy to shipping companies, the Secretary of State should adopt the criterion that the general level of charges to islands should not be materially in excess of charges to distant parts of the mainland”.

The Board noted the Norwegian experience of vehicle ferry operations and in particular that of the Norwegian county of Møre and Romsdal whose Chief Roads Surveyor Mr K H Oppegård recommended the adoption of simple Norwegian style roll through vehicle ferries in Shetland. The essence of the Norwegian approach, as mentioned earlier, is selection of the shortest crossings with standardised vessels and terminals, resulting in low operating costs, high frequency and low fares. The technique was adopted in Shetland and by Western Ferries firstly to Islay and subsequently on the Clyde but not elsewhere in Scotland. In short, this approach has the concomitant effect of reducing operating costs, which as stated earlier brings with it the multiple benefits of greater frequency of service, increased capacity, reduced ferry charges and less environmental damage.

Road Equivalent Tariff
The Highland Transport Board’s report was submitted to the newly appointed Highlands and Islands Development Board (HIDB), who considered it and prepared a detailed paper which described how a meaningful “mainland comparison” might be realised. The HIDB concluded that the simplest solution was:

“to create conditions for transport to the islands which are truly comparable with those on the mainland. This means considering the appropriate ferry and shipping links as roads or bridges. The car ferry to an island and the piers are, in fact, parts of a flexible road over which cars and commercial vehicles can pass to and from islands.”

The ensuing debate coincided with the conversion of most routes to RO-RO which made possible the introduction of a simple system of lineal charging on vehicles to replace the old and complex commodity based cargo rates. It had been hoped that this change would have the effect of reducing the cost of transporting at least full lorry-loads to the islands but this was found in practice not to have been the case. Concern about the burden of freight charges to island economies intensified and in

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4 Highland Transport Services, Highland Transport Board, 1967
1974 the HIDB re-examined the issue. Case study analysis revealed that in many cases island business was disadvantaged by sea freight charges. The HIDB case was re-stated and refined and the concept of “Road Equivalent Tariff” or “RET” was born.

The logic was that payment of road tax, used to construct and maintain roads, entitled road users to drive anywhere on the road system. Roads go everywhere except for reasons of geography to islands (and a few remote peninsulas). Islanders pay road tax but are uniquely denied access to the great bulk of the road system without paying a substantial ferry surcharge. Vehicle ferries act as roads between island and mainland. To be equitable, the cost to the road user of crossing the ferry should be related to the cost of travelling along an equivalent length of road. This would be achieved by charging a vehicle the equivalent of its road running costs that cease when the vehicle is being conveyed on the ferry’s deck. The shortfall between resultant revenue to the ferry operator and his costs would be met from taxation.

As vehicle operating costs can be expressed on mileage basis and related to the length of each type of vehicle, a formula was created to translate this concept into a lineal ferry charge. The formula included a “toll”, equivalent to 4 kilometres of distance; similar to tolls charged to road users for exceptional capital expenditure, such as on certain bridge crossings. Thus a one kilometre crossing would be charged as five kilometres, two kilometres, as six, etc. The formula was set out as follows:

\[ C = L \times O \times D + T \quad \text{or} \quad L \times O \times D + 4 \times L \times O \]

Where:
- \( C \) = charge for a single journey
- \( O \) = operating cost per km, per meter of vehicle length (average)
- \( L \) = length of vehicle in meters
- \( D \) = passage distance in kilometres
- \( T \) = toll element = 4LO

When these fares were compared with existing fares at that time, it was noted that the general effect was that passenger fares remained broadly in line with those then obtaining but vehicle rates were generally at a lower level than those then in force, particularly for commercial vehicles.

In the event RET and the short crossing concept excited much interest at the time but was rejected by Government of the time on grounds of expense. Where such methods were employed, in particular in Shetland and by Western Ferries on the Clyde, traffic volumes soared while subsidy costs per passenger or per vehicle were reduced or eliminated.

**International Comparisons**

Three decades later Comhairle nan Eilean (Western Isles Council) commissioned a study into ferry fares in which the concept of RET and alternative ferry charging mechanism were examined. Among its deliberations, the study compared the level of

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5 Roads to the Isles – A Study of Sea Freight Charges in the Highlands and Islands, HIDB, 1974
6 Western Isles Ferry Fares Mechanism Study, Napier University and Pedersen Consulting, 2006
passenger, car and commercial vehicle charges on ferries serving the Western Isles with a range of other subsidised and unsubsidised operators internationally. Interestingly, a number of islands furth of Scotland served by commercial unsubsidised operators, all had buoyant economies, despite high passenger fares and freight rates, e.g. the Isle of Man, Isle of Wight, Channel Islands, etc.

In graphing the data, it was found that for passenger fares the Western Isles trend line was roughly the middle of the scatter but at the high end of the subsidised routes. For car charges, the trend line showed Western Isles car rates quite high on the scatter, but higher, mostly by a wide margin, than all but one of the other subsidised routes, as illustrated in the graph below.

For commercial vehicle charges, it was found that the Western Isles routes come out higher than all but two of the other commercial examples and compared with other subsidised routes, the Western Isles commercial vehicles charges were about three times higher than the general trend.

The study found that fares systems cannot readily be separated from the way services are operated. The advantage of a cheap fare may, for example be offset by poor timings or inconvenient hours of operation. Thus, notwithstanding the high level of subsidy on Western Isles ferry services, the high charges were attributable among other issues to:

- A multiplicity of routes, several of them long
- Low frequency of service
- Inconvenient and variable timetables
- Low passenger loadings relative to capacity provided
- High crewing levels and high operating costs
- Non-optimised vessel utilisation

All these were symptoms of poor productivity as described above and are in contrast in operating style between state systems in other countries where ferries have been developed as part of the road system and the style of operation that obtains in the Western Isles that evolved from traditional shipping services.
**Elasticity of Demand**
The Western Isles study tested elasticity of demand based on price and frequency of service and established that frequency was at least as important as price and that while the price elasticity of demand was significant as regards passengers and cars, freight demand was price inelastic. In other words while reducing prices stimulated passenger and car traffic, it had little or no traffic generational effect on freight traffic conveyed on commercial vehicles.

This was borne out when the Scottish Government introduced a variant of RET on Western Isles services where passenger and car traffic were significantly stimulated, but freight was not, nor was there any perceivable reduction in shop prices. This posed the reasonable question; why subsidise freight when subsidy makes no material difference to economic outcomes? As a consequence, freight rates were returned more or less to their previous levels, again with no perceptible effect on commercial vehicle traffic or prices.

The scheme introduced by the Scottish Government was not RET in its original conception, because, if applied as such, charges on certain long routes such as Oban-Barra would have risen rather than reduced. In those cases rates at less than RET were applied. In similar circumstances, arguments for extension of RET to the long routes between Aberdeen and Orkney and Shetland were undermined by the fact that charges would have risen if RET had been applied in its pure form.

This form of RET for passengers and cars was gradually extended to other services operated by CalMac Ferries. There were a number of consequences. The increased patronage, by tourists’ cars and camper vans in particular on some routes exceeded the capacity of vessels to cope such that local residents could not book space for essential journeys. In some cases the decision by visitors to take cars, where they may otherwise have left them behind, resulted in a decreased patronage of island bus services.

**A More Focused Approach to Ferry Charges**
RET, even its current modified form, has undoubtedly stimulated traffic and economic activity within many island communities, but it is a blunt instrument that brings in its train a number of problems and is very costly to the public purse.

Many transport operators adopt yield management fares structures which in effect smooth out demand and maximise revenue by charging higher fares at busy times. The practice is now almost universal among airlines where extreme variations of fare may be found even by passengers sitting next to each other on the same flight.

For Scotland’s ferries the adoption of some form of yield management charging is well worth considering. One example of such a scheme is that operated by Red Funnel between Southampton and the Isle of Wight. An October Saturday booking in 2019 for one car plus driver can vary between £25.75 and £48.50 depending on time of travel and whether a saver or flexi ticket.

Some aims to be considered in introducing such a scheme in Scotland could be:
Maximising revenue to reduce subsidy levels, thereby releasing funds for education and health
Higher fares at times of peak demand
Higher fares for tourism to contribute, rather than abstract from the economy
Higher fares for camper vans and caravans as users are likely to spend less on island facilities
Reduced fares for island residents especially the low paid
Surcharging for use of a premium or 1st class on-board lounge on longer routes

One downside of present arrangements is that Government ferry fares schemes have been focused only on services heavily subsidised directly by it – namely – NorthLink and subsidiaries of David MacBrayne Ltd. This can have the effect of undermining more efficient private operators that provide reliable services at reasonable prices without any Government financial support at all and exclude local authority operated ferry services that are subject to their own fares regimes.

If more market orientated fares were to be aimed at tourists, non-island residents and hauliers, it would make sense for reduced fares to be available to all island residents regardless of who the operator might be, perhaps along the lines of the National Entitlement Card (bus pass). As with the bus pass which also serves, for example, as a library card, it should be possible for such cards to be made available to any person with a permanent island address and indeed for the licence number of any car registered at an island address to an island keeper to be added to the keeper of such a car’s card. In this way islanders and their cars could secure an agreed discount on the ferry charges pertaining to their island or archipelago. Such a card, colour coded for under 60s to distinguish it from the bus pass and applied universally, could also be used for islander air travel discount. If, in time, a full smart travel card system is created Scotland-wide for use on all or most forms of public transport, the above functions could readily be incorporated.

Adopting more demand responsive and focused charging regimes that maximise revenue, e.g. from tourism, but offer reduced cost passage for island residents would contribute to the Islands Plan ‘improving objective’ of ‘improving transport services’.

Conclusion
There are many examples of good practice in the provision of island ferry services in terms of good connectivity, cost effectiveness, environmental amelioration and community engagement. If, however, the current policy of building large inefficient ships and overly complex terminals that diminish the natural and built environments of some of our islands persists and is rolled out further, the already high financial and environmental cost to the Scottish Government will be hugely disproportionate to any benefits and will abstract from funding that could go to financially strapped health and education services. If, on the other hand, policy changed as recommended to adopt the more cost-effective and ‘greener’ practices, service frequencies and capacity would be enhanced, costs greatly reduced and island communities’ social and economic well-being would be improved.
To achieve the required shift in policy, a fundamental rethink of ferry policy and practice is required and should be undertaken by individuals or an entity familiar with best practice.
## APPENDIX 1

### CalMac Vesel Fuel Consumption

<table>
<thead>
<tr>
<th>Scheduled Dep Date</th>
<th>Passage</th>
<th>Fuel</th>
<th>Fuel/ hour</th>
<th>Car</th>
<th>Fuel/car</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Jan 2018 To 31 Jul 2019</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vessel Name</td>
<td>Passages</td>
<td>Fuel</td>
<td>Fuel/ hour</td>
<td>Car</td>
<td>Fuel/car</td>
</tr>
<tr>
<td>MV Loch Seaforth</td>
<td>7,861</td>
<td>12,892,687</td>
<td>1,640.08</td>
<td>143</td>
<td>11.47</td>
</tr>
<tr>
<td>MV Hebrides</td>
<td>5,403</td>
<td>7,960,292</td>
<td>1,473.31</td>
<td>90</td>
<td>16.37</td>
</tr>
<tr>
<td>MV Isle Of Lewis</td>
<td>4,244</td>
<td>6,087,540</td>
<td>1,434.39</td>
<td>123</td>
<td>11.66</td>
</tr>
<tr>
<td>MV Finlaggan</td>
<td>5,609</td>
<td>7,565,302</td>
<td>1,348.78</td>
<td>85</td>
<td>15.87</td>
</tr>
<tr>
<td>MV Clansman</td>
<td>4,546</td>
<td>5,958,315</td>
<td>1,310.67</td>
<td>90</td>
<td>14.56</td>
</tr>
<tr>
<td>MV Caledonian Isles</td>
<td>4,758</td>
<td>4,557,003</td>
<td>957.76</td>
<td>110</td>
<td>8.71</td>
</tr>
<tr>
<td>MV Lord Of The Isles</td>
<td>4,551</td>
<td>4,154,963</td>
<td>912.98</td>
<td>56</td>
<td>16.30</td>
</tr>
<tr>
<td>MV Isle Of Arran</td>
<td>3,769</td>
<td>2,908,934</td>
<td>771.81</td>
<td>76</td>
<td>10.16</td>
</tr>
<tr>
<td>MV Isle Of Mull</td>
<td>4,331</td>
<td>3,067,324</td>
<td>708.23</td>
<td>70</td>
<td>10.12</td>
</tr>
<tr>
<td>MV Hebridean Isles</td>
<td>5,368</td>
<td>3,695,074</td>
<td>688.35</td>
<td>64</td>
<td>10.76</td>
</tr>
<tr>
<td>MV Loch Portain</td>
<td>3,191</td>
<td>1,704,492</td>
<td>534.16</td>
<td>33</td>
<td>16.19</td>
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- Electro-diesel vessels