

Water Based Transport Slowing Down and Heading to the Water

By Michael Layden

Prognosis

The successful marketing of private vehicles and air travel means that any discussion of transport rarely gets beyond discussing the fuel economy of cars or the pros and cons of cheap flights. Even mentioning the possibility that personal transport might need to drop by 80-90 percent is met with indignation and incredulity. However, attitudes will be forced to change when faced with the prospect of an unsustainable transport system grinding to a halt in a few short decades.

The physical and moral need to drop energy use due to climate change and resource depletion will also curtail conventional economic activity, as it will affect most of the world's existing energy-dependent transport infrastructure and businesses. This in turn will limit the availability of other essential building materials and resources.

Much of the world economy is based on a high-volume, low[profit]-margin

model. While this worked when energy prices were low and relatively static, the price increases, generated by growing energy and fuel shortages, make this model unviable as a long-term strategy. Businesses will no longer be able to afford the oil they need to produce and transport the enormous volume of goods and services that they currently offer. If they choose to pass on their cost increases to the consumer, they will become less competitive.

Cost-conscious consumers will grow to realise that the price of goods is affected by the energy used to produce goods and the distance the goods travel. It's a no-win situation. The sustainability of different transport sectors in the future will very much be based on the ability of the sectors to attract enough investment and create enough cash flow to maintain their infrastructure.

High-level public investment in road and air travel is not a sound long-term

proposition. Under the new *National Development Plan* (NDP), the Irish government has committed €17.6 billion over five years to enhancing the country's road infrastructure. It has committed a further €1.9 billion to the air transport sector. At the same time, the pollution and ever increasing expense associated with road and air transport will inevitably, in the long run, serve to reduce road and air usage, making such enormous investments by the public sector both politically unpopular and economically untenable.

The auto-manufacturing industry itself is facing crisis: As fuel efficiency increases and vehicle life expectancy goes down (due to 'designed obsolescence' – a ploy to encourage car consumers to buy more vehicles over smaller time spans), the industry will soon reach the point where the energy needed to create one car will be more than is required to run it during its entire life time. In an effort to keep their opera-





tions profitable, manufacturers will inevitably pass their increased production costs on to the consumer. However, this will only serve to drive vehicle sales downward and move the industry deeper into crisis.

An Overlooked Remedy

*I*n light of the pressing need to move people and goods with the least possible energy expenditure, water and rail transport emerge as natural choices. Rail infrastructure is cheaper to maintain than road infrastructure. Public transport is to receive €12.9 billion from the NDP. While this expenditure may seem high, it is worth noting that rail systems are particularly resource efficient.

The millions of kilometres that rail-based rolling stock is capable of during its lifetime compares very favourably to the much smaller distances that trucks or cars achieve. Indeed, from a sustainability point of view, part of the seemingly high cost of maintaining and expanding rail systems is justified, as it covers the cost of designing for the long term. For example, services like electricity, communication, water and sewerage, which are built under trams or railroads, are placed in conduit in order to allow maintenance without disruption to the tram or railroad. In contrast, it is not uncommon to see the same roads being dug up several times in a year for repairs to different services – a consequence of road building which can only get worse as the shrinking availability of the fuel, needed to power road-work machinery, prevents the cheap dig-and-repair philosophy we have now.

While the government does seem to be at least somewhat aware of the need to invest in the rail system, the potential offered by our waterways is being severely neglected. However, investment in the water-transport system

could unlock a host of energy and cost savings – and a sustainable solution to our infrastructure needs.

Canals and Inland Waterways Infrastructure

*T*he industrial revolution left most of the developing world with extensive canals and inland waterways. Where the draft, locks and river systems allow large vessels to navigate, they are still highly competitive. In many countries, inland waterways are responsible for a very high percentage of the total transport tonnage. Waterway systems, such as those along the Rhine, Danube, Mississippi, Amazon, Seine and Volga river systems, are of regional importance and so are well maintained. However, smaller systems, such as the Irish and British canals and inland waterways, are often only maintained because they are in recreational demand. That said, the U.K. is starting to realise the potential of inland water transport. In recent years, there have been a number of new commercial contracts given on U.K. canal systems for the transportation of aggregates and waste, and the majority of materials used for the London Olympics will be transported on an upgraded existing waterway.

Barges

*B*arges are an intriguing transport option from a sustainability point of view. Many barges over 50 or even 100 years of age still travel up and down the world's canals. New barges are relatively easy to build and maintain. Also, when compared to road-bound vehicles, barges can carry greater loads at less cost.

However, the real potential lies in their propulsion systems. With a

small barge needing only 4 kilowatts of power compared to 250 kilowatts for a truck or 30 kilowatts for a hybrid car, the ability to run barges on electricity has a definite advantage in any future sustainable transport system.

Barges also have the advantage of being able to carry extremely large batteries with very little penalty in terms of load carriage. The viability of such a system has already been demonstrated: A whole system of electric barges carried bricks for a large German brickworks from the 1890s to the 1940s. Nowadays, it is possible to buy electric cruisers with a range of 50-55 kilometres, so the technology is readily available.

Short Sea and Coastal Transport Infrastructure

When it comes to sea transport, the infrastructure of docks and safety systems is expensive. However, in the past it has been possible to cover this expense with harbour dues and lighthouse levies. In the future, the maintenance of navigation and weather satellites will continue to be essential to minimise the loss of valuable ships and cargo, traditionally one of the major costs of maintaining a maritime trading capability.

Short-haul Ships

Modern short-haul sea ships are highly competitive with road transport, and there are a number of EU programs aimed at diverting more transport off the roads and onto the sea. Indeed the *Irish Maritime Development Office* has been working on establishing more routes between Irish ports and

Continental ports to reduce the dependency on rail transport. Most current short-haul sea transport, is based on ships in the 2000- to 25,000-tonne size range with speeds of 11-15 knots and higher – the main exception being ferries and container ships, which can travel between 20 and 40 knots. Just as with other forms of transport, fuel efficiencies drop dramatically with speed.

It is likely that it will be auxiliary (motorised) sailing ships and more-modern hybrid designs that will rule the short-haul sea routes in the decades ahead. Pre-1920s merchant schooners were plagued by delays caused by the need to wait for suitable tides and winds at ports. The number of crew needed to look after the sails was also a major economic handicap. Today, auxiliary engines, good weather forecasting and labour-saving technologies can remove such operational handicaps and help sailing vessels to regain importance as fuel prices rise.

Blue-Water / Ocean Vessels

Sailing ships were once able to compete with steam and motorised ships on long-distance routes where they did not have to fill their cargo holds with fuel. As late as the 1930s, sailing ships capable of carrying up to 5000 tonnes still carried phosphates from Chile and wool from Australia to Europe. About this time, the last of the great sailing ships were converted into training vessels, and since the 1940s a whole generation of new ones have been built. These could form the foundations of a new sail era.

Large sailing vessels have also been built for the recreational market. Of these, perhaps the most interesting are the large Windstar cruise ships. The largest ship is 25,000 tonnes, and the sails can be unfurled mechanically in just four seconds.

Conventionally powered ocean liners were masters of international travel up until the early 1970s. At that time it was possible to get passage to Africa, Asia, Australia and the Americas on a regular basis. However, the emergence of fast, cheap air travel has killed this industry. The potential for this market to re-emerge is immense as concerns about the environmental impact of flying continue to grow and modern hybrid sail vessels make long-distance travel more sustainable.

Slow Progress is Progress

In a world where speed seems to be the most important thing in regard to transport, we will increasingly have to ask ourselves whether the extra time saved really is worth the cost to future generations. Many of the solutions to our transport needs are not to be found in biofuels, hybrid terrestrial vehicles, or the hydrogen economy but in moving more slowly and in utilising our water resources more fully.

Visions of a low-energy world focus on the local. However, if future generations are to enjoy the mind-expanding pleasure of travel, we need to look at a national and international water-based transport system. Water-based might be slow, but it can accomplish great distances with the minimum amount of energy use and resource waste. Perhaps, in the future, serving and traveling at sea might again act as a right of passage for youths who feel constrained by the resource and energy desert we have bequeathed them.



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