Sustainable Sea Transport for the Pacific Islands: The Obvious Way Forward

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IN BRIEF 2014/36

Sea transport is the lifeline of Pacific countries and communities, moving the majority of people, goods and resources. It is crucial for trade, economic development and impacts upon virtually every development initiative. Yet for many Pacific countries, existing maritime transport services are increasingly unaffordable and unsustainable. Ships are often old, poorly maintained and inefficient, and there is a vicious cycle of old ships being replaced with old ships. Fossil fuel is often the largest single operating cost for shipping operators. Combined with narrow reef passages and small loads, many routes are unviable and uneconomic. Predicted near-future increases in both fuel and compliance costs means that this scenario is likely to get worse over time, meaning that governments and aid donors will be increasingly called upon to subsidise or service these routes.

However, a fast developing body of research identifies an alternative future pathway, involving a structured transition to low carbon shipping, that transcends these pessimistic forecasts. This *In Brief* outlines the main features of this emerging field and identifies the policy choices that must be made to enable a more sustainable Pacific islands sea transport future.

Sea Transport Issues in Oceania

Oceania, 10 million people and 25,000 islands scattered across 3 million square miles of the world's largest ocean, is arguably the region most dependent on sea transport. The unique characteristics of Pacific island shipping (long routes, minute economies, imbalance in inward and outward loadings, financing barriers, high risk, high infrastructural costs, etc.) present a greater challenge than for many other countries.[1] There has been a long history of the region struggling to find long-term, sustainable, and cost-viable solutions for sea transport, even in periods of relatively low energy costs.

The region is also extremely dependent on imported fossil fuels, which represent a major drain on economies, a major barrier to development and a source of vulnerability. The transport sector (land, air and marine) is the largest user of fossil fuels, accounting for at least 70 per cent of all Pacific island countries' use; sea transport is a significant user and in some cases the majority user. Electricity generation, in comparison, uses around 20 per cent of fossil fuel; however, most efforts to introduce low carbon alternatives have focused on electricity generation with over US$800 million currently queued for such projects. There is currently no funding available for low carbon shipping, despite proven potential for significant, cost effective savings.

The Global Case for Low Carbon Shipping

International shipping is undergoing an unprecedented increasing search for reducing reliance on fossil fuels, driven primarily by fluctuating but escalating fuel costs, international agreements to reduce greenhouse gas emissions, and increasing awareness of environmental and public health risk from shipping emissions. Since 2007, fuel costs have become the crucial parameter deciding where funds for new tonnage are placed, not the cost of the asset or ship operation. This trend is highly likely to increase given predicted future fuel and compliance costs. The recent IPCC Transport briefing shows transport to contribute 25 per cent of greenhouse gas emissions and to be the fastest rising of any energy end-use sector.

There has been a recent concentrated effort by a range of universities, research organisations and industry groups to develop low carbon shipping solutions, including renewable energy technology, particularly wind and solar. This mirrors innovative research during the last oil crisis but discontinued when marine fuels became financially viable again. This research has resulted in rapid advances in ship designs (especially hull, waste heat recovery and propeller related technology), use of alternative fossil fuels such as liquified natural gas and methane and renewables including wind power (kite, sails, soft sails, fixed wing and rotors), photovoltaics for assisted power and propulsion and biofuels. However, most innovation effort at the global level is targeted at large-scale shipping. Small-scale shipping, the most prevalent size servicing the needs of the world's most vulnerable, and Small Island Developing States in particular, is not receiving adequate priority.

Renewable Energy Shipping in Pacific Islands

In 2013, the University of the South Pacific and the International Union for Conservation and Nature

established the Oceania Centre for Sustainable Transport (OCST) as a catalyst for applied research in this critical field. Fortunately, the OCST is able to draw on the findings from a range of innovative sustainable energy sea transport projects conducted in the region during the last oil crisis. The primary target of these projects was at village and island level, primarily for cargo and passenger transport and artisanal or small-scale commercial fishing. Design and trials included retrofits of sails on passenger/cargo ferries, designs of energy efficient freighters for inter-island work, and sail-assisted village or island level catamarans for transport and fishing. These results, together with the results of a range of new research projects, have led to the following preliminary findings:

- The records of the past experiments have left a portfolio of analyses and vessel designs. These projects demonstrated that in times of high fuel cost, use of renewable energy technologies achieved significant results for modest investment. There have since been enormous advances in low carbon technologies.
- Biofuels, particularly from coconut oil and biomethanes, have application potential, again especially for more isolated communities with high biomass availability.
- Low-carbon shipping offers benefits across multiple areas: economic, environment, social, and cultural. It offers a potential future where fleets of smaller but sustainable new ships could replace current single, aged, large vessel operations.
- Policy and financing have been identified in both Pacific and international studies as the primary barriers to practical implementation. These issues are complex and require a re-evaluation of previous approaches and meta-strategies.
- The field is emergent with increasing international organisations developing designs for small sail and solar freight carriers, and designs such as OCIUS and Greenheart Project that have application in local transport and tourism sectors. These organisations have indicated interest in using the Pacific islands region as a test ground for their new designs and in working collaboratively with OCST.
- Revitalising pride in the Pacific's seafaring heritage as master voyagers, innovators and naval designers is a key vector for encouraging uptake in this field.

Policy Implications

The research done to date has established a strong theoretical case that a shift from fossil fuel-powered transport to energy-efficient designs and renewable energy technologies will result in a range of positive development initiatives. There is a demonstrated potential to significantly decrease fuel dependency and cost effectively increase connectivity. The agenda needs to be viewed ultimately from its potential to revitalise all aspects of the domestic Pacific industry, from ship construction to transport operations to maintenance and end recycling — a cradle to cradle approach. The next step in developing this research is the continued strengthening of the OCST network and a commitment by donor and regional agencies and governments to a co-ordinated regional research and education programme and funding 'proof of concept' examples.

References

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Endnotes

1 Further information on our research and our international partners can be sourced from <http://pace.usp.ac.fj/ocst/HomePage.aspx>.

Author Notes

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We acknowledge the Australian Government's support for the production of *In Brief*.