

GSDR 2015 Brief

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

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Introduction

Sea transport is the lifeline of Pacific Island Countries (PICs) and communities, moving the vast majority of people, goods and resources. It is crucial for trade and economic development and impacts upon virtually every development initiative (UNCTAD, 2014). Yet for many PICs, existing maritime transport services are increasingly unaffordable and unsustainable (AusAID, 2008; Nuttall et al 2014a).

Ships are often old, poorly maintained and inefficient (ADB, 2007), and there is a vicious cycle of old ships being replaced with old ships (Nuttall et al, 2014a). 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 increases in both fuel and compliance costs means that this scenario is likely to get worse over time, meaning that governments and donors will be increasingly called upon to subsidise or service these routes (Nuttall et al, 2014a).

However, a fast developing body of research identifies an alternative future pathway involving a structured transition to low carbon shipping. This 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 Pacific, the world's largest ocean, is arguably the region most dependent on sea transport in the world.

The unique characteristics of Pacific island shipping (long routes, minute economies, imbalance in inward and outward loadings, financing barriers, high risks and high infrastructural costs) present a greater challenge than for many other countries. 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 (UNESCAP, 2010). This is especially true for domestic transport.

The region is also extremely dependent on imported fossil fuel, which represents a major drain on economies, a major barrier to development and a source of vulnerability (Jafar, 2000). The transport sector (land, air and marine) is the largest user of fossil fuels, accounting for at least 70% of all PICs use (Mofor et al, 2013). For PICs, sea transport is a significant, and in some cases the majority, user. Electricity generation, in comparison, uses around 20% of fossil fuel. Most efforts to introduce low carbon alternatives have focused on electricity generation (Prasad et al, 2013) and the need to decarbonise Pacific island transport has yet to be addressed.

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The global case for low carbon shipping

International shipping is undergoing an unprecedented search for efficiency of fuel use, driven primarily by fluctuating but escalating fuel costs, international agreements to reduce GHG emissions, and increasing awareness of the environmental and public health risks associated with shipping (Holland et al, 2014). In 2010 transport contributed 23% of total energy-related CO₂ emissions, with emissions projected to approximately double by 2050 (Sims et al, 2014).

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 likely to continue given predicted future fuel and compliance costs.

Recently there has been a 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 has resulted in rapid advances in ship designs (especially hull, waste heat recovery and propeller related technology), use of alternative fuels such as LNG and methane and renewable energies, including wind power (kite sails, soft sails, fixed wing sails and rotors), photovoltaics and biofuels (Royal Academy of Engineering, 2013; Mofor et al, 2015).

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, if any, priority.

Renewable energy shipping in the Pacific

In 2013 The University of the South Pacific and the International Union for Conservation and Nature - Oceania Regional Office established the Oceania Centre for Sustainable Transport (OCST) as a catalyst for applied research in this critical field.

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, mainly for cargo and passenger transport and artisanal or small-scale commercial fishing.

Designs 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 scale catamarans for transport and fishing. These proved that significant savings (30% plus) were achievable at favourable rates of investment (ADB, 1985; Clayton, 1987; Satchwell, 1985).

These results, together with the results of new research initiatives, have led to the following preliminary findings:



- Past trials have left a portfolio of analyses and vessel designs that 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 for shipping.
- Biofuels, particularly from coconut oil and biomethanes, have potential, especially for isolated communities with high biomass availability.
- Low carbon shipping offers multiple economic, environmental, social, and cultural benefits. It offers a future where fleets of smaller but sustainable new ships could replace single, aged, large vessel operations currently used.
- 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 (Rojon, 2014; Nuttall et al, 2014b).

- The field is emergent with increasing numbers of organisations and individuals developing designs for small sail and solar freight carriers, with strong potential application in local transport and tourism sectors.
- Revitalising pride in the Pacific’s seafaring heritage as master voyagers, innovators and naval designers is a key vector for encouraging uptake.



Policy implications

The research to date has established a strong theoretical case that a shift from fossil fuel-powered sea transport to energy-efficient designs and renewable energy technologies will result in a range of positive development initiatives. There is demonstrated potential to significantly reduce fossil 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 and transport operations to maintenance and end recycling — a cradle to cradle approach. Achieving this requires commitment by donors,

agencies, governments and industry to prioritise research and development of ‘proof of concept’ examples and to provide an enabling regulatory and policy environment.

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