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Turning the Tide: the need for sustainable sea transport in the Pacific

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ABSTRACT

This paper reports on progress in developing a regional research and education strategy for Pacific Island countries and communities wishing to transition to a low carbon sea transport future. Sea transport is an absolute necessity for most such communities. All current services are fossil fuel based and are becoming increasingly unaffordable and unsustainable. The countries in the Pacific region are the most dependent on imported fossil fuels in the world, importing more than 95% of needs. Such dependency is having a crippling effect on national budgets and major impacts on key productive sectors. The region's transport issues are unique; small and vulnerable economies scattered at the ends of some of the longest transportation routes in the world and arguably the most challenging to maintain per capita and per sea mile. Alternatives to current fossil fuel powered sea transport have been almost totally ignored in recent regional and national debates and the issue has been largely invisible within the policy and donor strategy space at all levels despite concerted efforts over more than two decades to transition Pacific countries' electricity sector fossil fuel use. The University of the South Pacific has been collaborating with a network of stakeholders and knowledge partners since 2012 to advance this agenda, building off previous doctoral research and the resultant Sustainable Sea Transport Talanoa 2012. Prasad et al. (2013) set out the basis for a catalytic research program following from the consensually agreed outputs of SSTT 2012 and this paper records the progress made since.

1. Introduction

In 2013, a newly formed interdisciplinary research team at The University of the South Pacific (USP)[1] set out the objectives of a one-year project designed as a catalyst to populate and invigorate an informed debate for Pacific Island Countries (PICs) and communities of Oceania seeking low carbon alternatives for current and future sea transport [1]. The initial research design aimed at positioning a much longer-term program of research and education for this critical but hitherto largely unexplored field by initiating and maintaining key relationships, preparing a detailed long-term strategy and commencing a number of case studies.

The program is predicated on the assumption that a collaborative effort of multiple partners at various levels will be required to achieve a transition of any meaningful scale over time. The PICs need to reach out to expertize beyond its own region. In effect this requires the development of a transformative knowledge network to backstop a paradigm shift (see Hackmann and St. Clair [2], for an overview of the concept of transformation knowledge networks). In the initial paper [1], USP committed to reporting back after one year. This paper provides a synopsis of the current sea transport challenges; a summary of the evolving research results; and an overview of the support needed for an ongoing research agenda for Oceania.

2. Synopsis: Oceania and its shipping

Oceania, with some 10 million people and over 25,000 islands scattered across more than 3 million square miles of the world's largest ocean, represents arguably the most dependent region on sea transport (Fig. 1). Displaying great diversity, from small island states such as Tuvalu (with an area of 26 km^2 and a population of just over 10,000) to Papua New Guinea (PNG) (approximately 462,800 km^2 and over 6 million people), the island and atoll states of this maritime region face similar challenges in terms of finding sustainable solutions for transitioning to low carbon shipping.

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[1] USP is one of two regional universities in the world. USP's 12 member countries are: Cook Islands, Fiji Islands, Kiribati, Republic of Marshall Islands, Nauru, Niue, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu and Vanuatu.

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Sea transport, especially at the domestic level, has always presented a difficult issue for PICs to find long-term, sustainable, and cost-viable solutions for, even in periods of low fuel costs [3–5]. The unique characteristics of Pacific shipping (minute economies at the end of long routes, imbalance in inward/outward loadings, financing barriers, high operational risk, and high infrastructural costs) present a greater challenge than for most other countries and regions. This is particularly true for the domestic local and country scenarios.

All current options are fossil fuel powered. Imported fuel prices and the demand for global emissions reduction will continue to rise in the long-term. The PICs are the most imported fossil fuel dependent in the world with 95% dependency, 99% if PNG and Fiji are excluded [6]. Inversely to global sector apportionment, transport uses some 70% of the total fuel imported regionally and sea transport is the majority fuel user for some PICs [5,7,8]. Tuvalu, for example, reported that 38% of total fuel imports or 64% of all transport fuel in 2012 was for maritime use or ~38% of total fuel imports [9]. Many existing maritime services are increasingly unaffordable and unsustainable. Ships are often old, poorly maintained and inefficient. Fossil fuels represent a significant proportion of shipping operating costs, often the largest single cost. Accessing asset and operational finances is difficult. This results in a vicious cycle of old ships being replaced with old ships, and the need for larger ships to achieve economies of scale. This, combined with narrow reef passages, small harbors and small cargos and numbers of passengers, leads to many routes being commercially marginal or even unviable. Governments are often required to subsidize or service these routes if communities are to have access to transport [5,10].

3. The invisibility of low carbon shipping in regional development

Despite the identified need and the increasing availability of alternatives, meaningful steps to address this sector have yet to eventuate [11]. Low carbon sea transport solutions have been almost invisible in the policy space at national, regional and particularly donor levels. The issues have been well characterized [1,10,12]. One representative case example is offered. On the Fijian island of Kadavu in 2008, outboard fuel prices rose to more than US$ 1.39/litre. In direct response the children from neighboring Ono Island were taken home from boarding school because the villagers could not afford the cost of weekly food rations trips, and in Kavala Bay the health nurse replaced her fortnightly pregnancy checks to monthly visits [6]. Similar examples are the norm across the region, which expects the need for and the cost of sea transport to increase for the foreseeable future [13–15].

Global interest in low carbon technologies for shipping is growing, but solutions at the small-scale level appropriate to the domestic needs of PICs have yet to be seriously explored. Past research and recent findings highlight strong potential for such technology to provide practical and multiple benefits to PICs, measureable across economic, environment, social and cultural baselines [1,6,10]. However the focus across the region to reduce fuel dependency to date has been almost exclusively on electricity generation. The regional renewable energy discourse has become largely synonymous with electricity, reflecting global perceptions, agency and consultant bias but not necessarily Pacific realities. Commitment of more than US$ 535 million targeted at diesel dependency reduction by donors at the Pacific Energy Summit in Auckland in 2013 was confined almost exclusively to electricity programs with no projects directed specifically at sea transport [5].

There has been no concerted program to apply such priority to PIC sea transport. The barriers are complex and poorly understood [11]. A growing range of technological solutions are available or emergent [16,17]. There were a number of small but critically important experiments conducted in this field during the last oil crisis, several in the Pacific, but the lessons of these have largely been lost to history [6,10,18–24]. These experiments showed that for modest investments major savings in fuel use from existing proven technologies were available for local shipping.

Recent published studies identify barriers to transformation in Pacific, Norwegian and global shipping [16,25–28]. These studies concur that institutional barriers, including access to financing, managerial practices and legal constraints, sit alongside technology issues constraining transition to low carbon shipping. This is similar to USP's findings for the Pacific [11] that policy and financing barriers are as great if not greater challenges than availability of technology. Many of the barriers are perceptual as much as factual but appear deeply entrenched. Such conclusions have been foreshadowed in previous theoretical studies looking at barriers to transport de-carbonization programming [29,30].

Increasing concern over PICs' fossil fuel dependency, the search for low carbon futures and the crucial role of sea transport for Oceanic communities make the establishment of such a research agenda a logical priority. There are two critical focal areas for research and action: at an international level in terms of greenhouse gas (GHG) emissions causing climate change [31] and at a regional, national, community and household level where the maritime sector is often the single largest user of imported fossil fuels [5,7,8,10,32].

4. The relationship between local shipping need and the global emissions discourse

Shipping is a major and increasing source of global GHG emissions, estimated in 2009 at 3.3% of global totals and projected to rise by 150–250% by 2050 (see in particular [33–35]). Nitrous Oxide (NO*x*) and Sulfur Oxide (SO*x*) emissions are disproportionally high for shipping, ranging from 10% to 15% and 4% to 9% of global anthropogenic emissions respectively [33,36–38].

Emissions from shipping have grown substantially [38,39] due to growth in demand outpacing the growth in efficiency [26]. International regulation of this sector has lagged behind other major international energy use sectors [40,41]. Shipping emissions must be dramatically reduced if global targets for climate change are to be achieved. The only alternative is for other sectors to perform above target to compensate. Ship emissions reductions were placed outside of Kyoto and similar agreements.

The speed of change in achieving overall reductions of global emissions is of critical importance to Oceania. The 2013 Pacific leaders' Majuro Declaration for Climate Leadership called for urgent action at all levels to reduce GHG emissions. Most PICs have set ambitious targets for reducing their own emissions, although any reductions they achieve will have no impact on global totals. It may however have an impact on global trends by demonstrating PICs' commitment to 'punch above their weight' and lead by example.

5. The relationship between PIC sea transport and fossil fuel dependency

The Pacific Island Countries and Territories' (PICTs)[2] fuel bill in

[2] The regional political grouping varies depending on whether the various colonies, territories and dependencies (such as French Polynesia, Tokelau, American Samoa, New Caledonia) are included alongside independent countries.

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