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A close-up photograph of a hand holding a fishing net. The net is made of light-colored twine and is stretched across the frame. The background is blurred, showing the faces of people, suggesting a community or market setting. The lighting is natural, highlighting the texture of the net and the skin of the hand.

Bridging Papua New Guinea's information divide

SHANE MCLEOD
JULY 2021

BRIDGING PAPUA NEW GUINEA'S INFORMATION DIVIDE

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EXECUTIVE SUMMARY

In the lead-up to the 2022 national election, Papua New Guinea must bridge its information gap through investment in the public broadcaster.

KEY FINDINGS

- Access to reliable public information is critical for Papua New Guinea as it heads towards national elections in mid-2022. The country's public broadcaster needs urgent support to keep radio transmitters on air and to reach 'disconnected' audiences who have no other means of receiving public information.
- Australia should support Papua New Guinea to upgrade the National Broadcasting Corporation's radio transmission capacity ahead of the vote by funding transmitter upgrades in under-served towns and regions, and by trialling a national shortwave service broadcast from offshore to provide coverage to the entire country.
- While the National Broadcasting Corporation implements medium-term strategies to achieve nationwide coverage, it will need to restructure its operations based on a more efficient regional production model, and focus on making its broadcast transmission operations financially and technically sustainable.

EXECUTIVE SUMMARY

What is the problem?

Papua New Guinea's public broadcaster, the National Broadcasting Corporation (NBC), plays a critical role in connecting and informing the nation, especially those citizens without access to other forms of communication. However, the public broadcaster's transmission infrastructure is degraded and fails to reach a national audience. This is a critical problem ahead of nationwide elections scheduled for mid-2022.

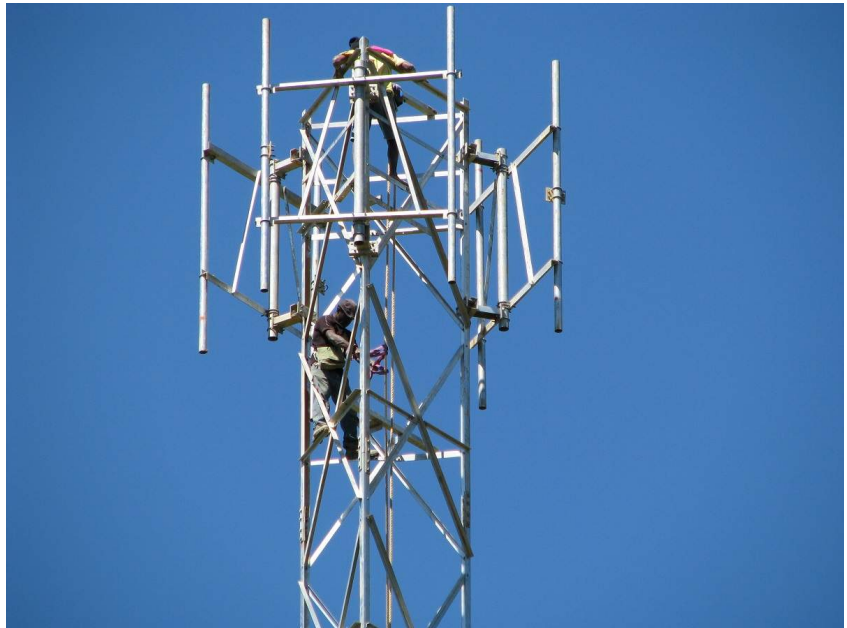
What should be done?

Targeted investment by Australia and other international donors can re-establish an effective nationwide radio service in time for the 2022 elections by contracting offshore shortwave broadcasters to retransmit NBC's national service to the entire country. Further investment can re-establish critical onshore transmitters in time for the vote. Beyond the elections, NBC needs ongoing support to restructure its operations, and infrastructure to remain relevant, reliable, and able to fulfil its critical role informing and connecting all of the country's citizens. These investment decisions should take into account the importance of maintaining a service for the 'disconnected' citizens of Papua New Guinea (PNG) while also supporting the ongoing viability of PNG's broadcast media.

INTRODUCTION

The concept of the 'digital divide' is well known: the idea that the advent of technology divides society into those who have access, and those who do not. For those who have access, new technologies open up seemingly infinite options as internet bandwidth mushrooms, mobile devices proliferate, on-demand video and entertainment services abound, and government and business move to online platforms. Those on the other side of the divide are left with platforms, systems, and technologies that seem — at least to the 'haves' — to be obsolete.

For the 'have nots' in PNG, radio remains a compelling proposition: it is free to access, cheap to produce, and efficient to operate. Globally, radio is an obvious information solution for the estimated 3.6 billion people who make up the 'global disconnected', those who have no technical access to internet or digital communications, or who lack the financial resources to utilise it.¹



Papua New Guinea's largest mobile phone provider, Digicel, claims 85 per cent of the population has access to at least a 2G mobile phone signal (Image: Kahunapule Michael Johnson/Flickr).

In PNG, defining the number of citizens who fall into this 'disconnected' category is an imprecise exercise. In terms of 'technical' disconnection, the country's largest mobile provider claims 85 per cent of the population has access to at least a 2G mobile phone signal. It says its networks cover as much as 53 per cent of PNG's geographic

landmass.² Yet subscriber data suggests that mobile penetration rates are as low as one in three people.³

In contrast, radio's availability is theoretically universal. When NBC's transmission network is operating at full strength, people should be able to receive a shortwave, medium-wave, or FM radio signal almost anywhere in the country. Yet in reality, NBC struggles to be heard. As few as one in three of the public broadcaster's transmitters is operational. Most of those that remain in service are reaching urban audiences that in many cases already have other media options. But four in five people in PNG live in rural and regional areas and many of them remain out of reach of NBC's urban-based signals.

As elections loom in July 2022, NBC's role is even more critical in a country where communities are disconnected from the processes and decisions of national government agencies. This paper argues that international donors such as Australia, in collaboration with PNG's government, should prioritise investment in NBC to get its voice back on the air, and to make these 'disconnected' citizens in rural and remote PNG their primary focus. The public broadcaster is a crucial source of reliable information for the entire nation, in terms of daily news and weather, education, public health, entertainment, and natural disasters.

Australian investment in NBC's governance and production capacity over a decade and a half has been largely successful, boosting the broadcaster's ability to create and produce content that fulfils development goals under the Media Development Initiative funded by Australia's Department of Foreign Affairs and Trade.⁴ But, as one review of the Australian assistance has noted, this capability means little if audiences cannot hear it.⁵

NBC has also strengthened its management capacity, evidenced in successful political engagement resulting in capital funding for studio and transmitter rehabilitation. But more funding is needed, and quickly, to ensure that NBC's voice is ready to be heard in time for the 2022 vote.

This means targeted spending in the months ahead of the elections to get transmitters and broadcast infrastructure back in operation. It also means supporting NBC's efforts to ensure it is sustainable beyond the election. Future support for NBC will need to focus on the organisation's structure, and its infrastructure plans, to ensure its services remain functional, relevant, and cost effective.

More funding is needed, and quickly, to ensure that NBC's voice is ready to be heard in time for the 2022 vote.

Every effort should be made to support NBC's investment in transmission and upgrades to its studios.

The recommendations in this paper fall under three broad themes:

First, there should be an immediate focus on broadcast radio as the most effective means to inform and connect all of PNG's citizens.

This means getting critical radio transmitters back on air in time for the lead-up to the 2022 elections. With only limited time before the vote, a dedicated nationwide NBC service can only be feasibly re-established from an offshore shortwave transmitter site in Australia or another nation. A trial service should be funded and established as an immediate priority with the benefit that it can also establish the audience for such a service.

Second, NBC should be supported to develop and implement its own domestic transmission investment program and to restructure its operations to align with this core strategy.

Every effort should be made to support NBC's investment in transmission and upgrades to its studios. Its future financial stability is contingent on restructuring its operations in the most efficient way based on a regional transmission model.

Third, the long-term future for broadcasting in PNG requires its costs and operations to be reconfigured to become financially and technically sustainable.

The availability of digital platforms to users — primarily in urban areas — will challenge the economics of traditional broadcasting, and incumbent players will need to ensure their operations are efficient and sustainable. NBC is the largest player in PNG's broadcast industry and has a central role to play in discussions about potential consolidation and restructuring within the transmission infrastructure sector. Government policy decisions with respect to media ownership laws and digital broadcasting offer an opportunity to investigate different operating models and structures for the future.

There are critical investments to be made now in preparation for the election, and a need to look ahead to ensure that NBC is best prepared to remain an enduring part of PNG culture and public life for years to come.

RESTORING RADIO ACROSS PAPUA NEW GUINEA

For a country as diverse and dispersed as Papua New Guinea, radio remains the obvious platform for reliable and effective communication with a majority of the country's citizens.

Radio is cheap to produce, free to access, and flexible enough to deliver everything from news and weather to agricultural extension and entertainment. Such a mass communication platform is essential in a developing country of more than 8.9 million people⁶ where around a third of adults cannot read;⁷ mains electricity is available to only 13 per cent of the population;⁸ and rural subsistence agriculture remains the dominant way of life.

Apart from playing a critical role in disseminating information, radio is a lifeline. PNG is one of the world's most disaster-prone countries, where tropical rainfall, rugged geography, and active geological activity can result in environmental hazards from cyclones, floods, landslides, earthquakes, and volcanoes. The recent experience of COVID-19 has further highlighted these challenges as PNG's health system has come under considerable strain.

Media and broadcasting in Papua New Guinea

Radio is a dominant part of PNG's diverse media sector and has been since well before independence in 1973. In today's media environment, radio-listening remains a big part of citizens' media diets, with half of adults in one recent survey reporting regular radio use, and more than two-thirds of households having a radio.⁹

The radio industry operates under a mixed model with commercial, public (government), and community ownership of stations. There are two main commercial radio networks: PNGFM and FM100/Kalang Advertising. Each network operates stations from centralised studios in Port Moresby with programming distributed via satellite and landline to FM transmitters across the country, mostly in major urban centres. FM100 is government-owned through the state telecommunications company Telikom PNG but operates on a commercial basis.

Public broadcaster NBC operates provincial ('Kundu') and national ('Karai') radio services as well as a youth-focused service, Tribe FM, and a national television service. It has radio studios and local transmitters

Radio is cheap to produce, free to access, and flexible enough to deliver everything from news and weather to agricultural extension and entertainment.

As the national broadcaster, NBC has a mandate to provide universal coverage within PNG.

in most provincial centres, and its national headquarters in Port Moresby. NBC's funding comes from a mix of direct government grants, advertising and sponsorships, and some additional funding from provincial governments and MPs' district support funds. Total budgeted funding for NBC from PNG's government in 2020 was K26 million (approximately AU\$10 million).¹⁰ In addition to the commercial and public broadcasters are community and church-based services.

Beyond radio, PNG has one of the Pacific region's largest media industries. There are three television networks: NBC's domestic service; EMTV, which is also owned by Telikom PNG but operates commercially; and the mobile provider Digicel, which offers free-to-view channel TVWan on its subscription access platform. Two daily newspapers are published and distributed to major centres across the country, and there are three weekly newspapers.

Each of the major media outlets also publishes online and on social media as an adjunct to their primary platforms. Social media is an increasingly influential part of the media landscape, with an estimated 11 per cent of the population reported to be active users of Facebook.¹¹

A 2019 survey of media access in PNG found that radio remained popular, but that audiences are declining, driven by poor access to services.¹² Radio listeners in larger centres have access to a number of stations mostly on FM, including the domestic commercial, public, and community stations, with international broadcasters such as Radio Australia and BBC World Service also carried on local frequencies in some centres. Outside major centres and in rural areas, services tend to be limited to NBC services, where they exist.

NBC's transmission network: a complex undertaking

As the national broadcaster, NBC has a mandate to provide universal coverage within PNG. However, its current transmission network struggles to fulfil the charter. This network is a complex undertaking: around 50 transmitter sites, with 19 studios and sites in nearly every province. Many of its transmitters are simply out of operation. As few as one in three of NBC's transmitters are on air, and those that are operational tend to be the low-powered FM transmitters, which reach listeners in urban areas but few people beyond.¹³

Over a number of years, **FM transmission** has become the default means of broadcasting NBC services. Transmitters are cheap to install and relatively easy to operate and maintain. It is also easy for audiences

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to receive FM signals through portable radios and many mobile phone handsets. Sound quality is excellent, but transmission is 'line-of-sight', meaning signals are not able to reach over geographic features such as mountains — a major challenge in PNG. FM works well for urban centres, but given PNG's topography, transmitters struggle to reach rural and remote audiences.



Mobile phone data suggests that penetration rates in Papua New Guinea are as low as one in three people (Kahunapule Michael Johnson/Flickr).

NBC's **medium-wave or AM** transmitters are in theory the backbone of its transmission network. Sites should give wide coverage, but are more demanding in terms of land size, maintenance, and operational costs. Most of NBC's medium-wave sites are out of commission. As an example, NBC's Port Moresby site has been the subject of a decade-long legal dispute,¹⁴ and in 2018 a road project funded by China's government was built over the site, dramatically limiting its technical capability.¹⁵ AM is relatively easy to listen to on portable and car-installed radios, but not through mobile telephone receivers.

Beyond the AM and FM transmitters, **shortwave services** should give NBC the ability to reach into remote and regional areas. While audio quality and accessibility are more difficult, shortwave signals bounce off the upper atmosphere to reach long distances. However, almost all of these critical transmitters are now off air, with only sites in Madang and Bougainville thought to remain operational. Shortwave also requires a more advanced radio to receive, and requires regular re-tuning of frequencies.

The experience of other international broadcasters suggests that shortwave remains vital, particularly in the developing world.

NBC's transmission shortcomings also create their own reality for rural and regional audiences: when there is nothing to listen to, what point is there in buying or maintaining a radio? This is especially so for people who might have used shortwave in the past, who have been further discouraged by decisions such as the ABC ending its Radio Australia shortwave service that targeted PNG and the Pacific.¹⁶

It is therefore unsurprising that repeated audience surveys show that radio is becoming less relied upon by media consumers, particularly in rural PNG.¹⁷ However, when people are asked, they express a clear preference for radio services to be restored and maintained.¹⁸

Shortwave in developing markets

The experience of other international broadcasters suggests that shortwave remains vital, particularly in the developing world. The BBC World Service has in recent years renewed its focus on shortwave to reach vast areas of Africa and Asia.¹⁹ Radio New Zealand remains committed to shortwave in the Pacific and has made efforts to enhance its capacity to reach audiences in PNG,²⁰ as well as retransmitting Radio Australia's Melanesian-language programming in the region.²¹ Vanuatu broadcaster VBTC has renewed its investment in shortwave and medium-wave with transmitters to cover the country's sprawling island territories.²²

While the limitations of traditional analogue shortwave are well known, new digital formats make it a more attractive option. The Digital Radio Mondiale (DRM) standard allows for high-quality audio transmissions over shortwave frequencies. DRM has been adopted in a number of large markets including India, South Africa, and Brazil. The main obstacle to adoption of DRM has been the cost of receivers. The growing uptake in India especially means receivers are expected to fall in cost to as little as AU\$14 per unit within the next year.²³

The BBC World Service characterises the future market for radio as being able to reach the 'global disconnected'.²⁴ It estimates there are as many as 3.6 billion people around the world who have no access to communications other than radio. Shortwave, coupled with next-generation medium-wave, remains one of the best ways to keep these people connected and prepare for future services. Rural and remote audiences in PNG fall within this group. NBC's challenge is to deliver a service that meets the needs of these citizens.

ELECTION 2022: TIME TO RESTORE PNG'S VOICE

The 2022 election looms as a deadline by which the current situation needs to be improved to ensure audiences across PNG have a reliable source of information during the democratic process. NBC's coverage of the campaign, and its role in providing live scrutiny of election counts, makes its presence critical.

An immediate focus should be on restoring as many services as possible so they can be online in time for next year. Decisions about which sites to prioritise should take into account the audiences that most need access to the service: those in remote and rural PNG, and those in urban centres without other options. Further, assessments should be made to ensure investments are cost effective and achievable in a reasonable timeframe.

The assessments should consider:

Audience impact — Prioritise investment in sites that can reach remote and rural audiences, and those with limited access to alternative media and communications platforms.

Scope and cost — Concentrate funds on sites where the lowest cost repairs will bring equipment back into operation.

Resilience — Place priority on sites where technical and operational support is more available and other inputs, such as electricity supply, are more reliable.

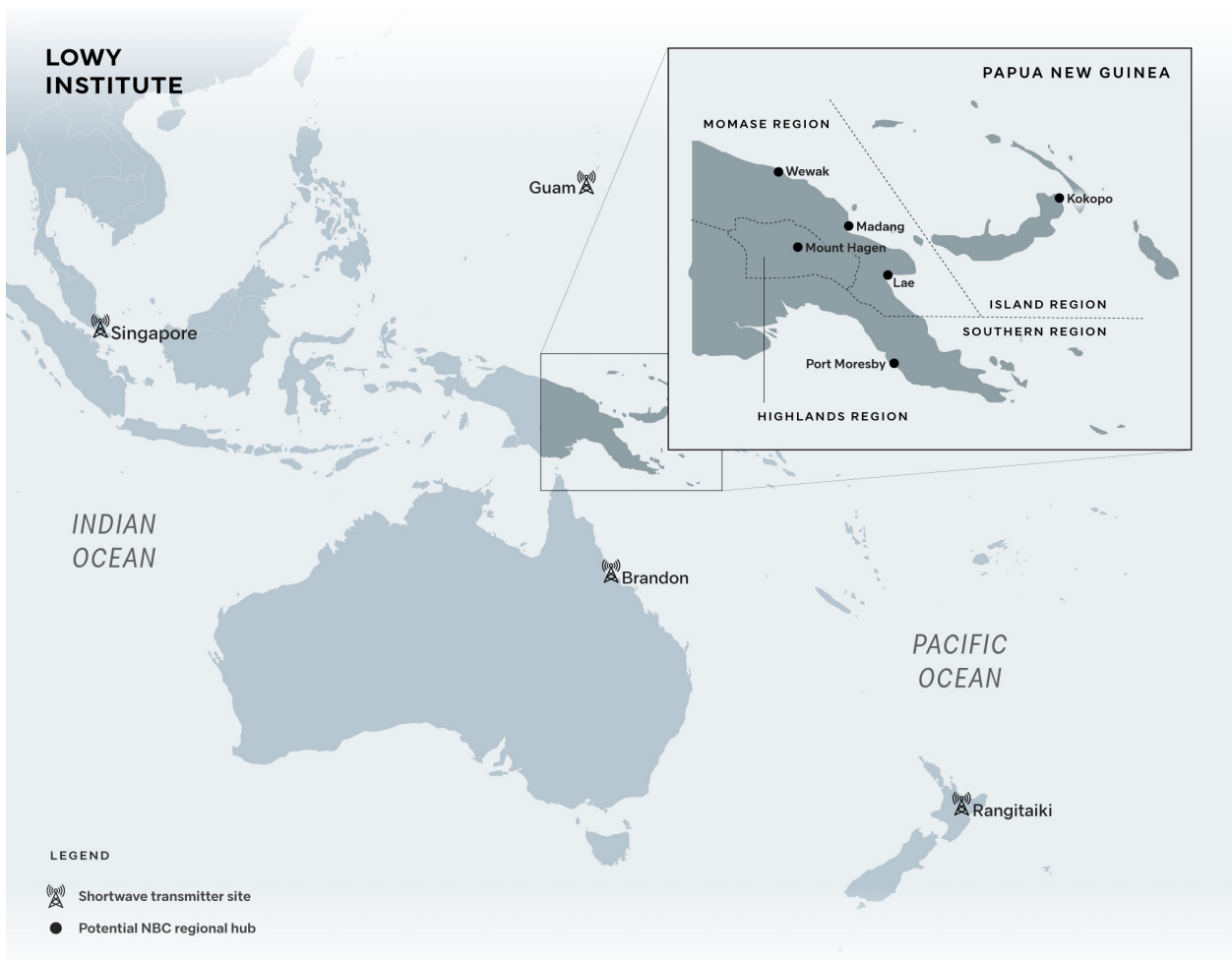
Existing provincial shortwave sites at Madang and Bougainville are examples of transmitters that have recently been in operation, and could benefit from immediate attention to reach remote audiences. FM transmitters in smaller provincial centres and districts that require parts or repairs would also be priority targets for investment.

Medium-wave and shortwave transmitters that are essential to NBC's longer-term audience goals will require more time and money to identify, prepare, and re-establish. For these sites, there is unlikely to be enough time to achieve these outcomes prior to the 2022 election period. Yet these platforms remain the only viable means to connect with those remote and regional audiences. Therefore, the only way to quickly restore a national service in time for the voting period will be to fund a service that is transmitted from offshore.

An immediate focus should be on restoring as many services as possible so they can be online in time for next year.

OFFSHORE TRANSMISSION OF NBC NATIONAL SERVICE

With funding from Australia or another international partner, such a service could be launched from an established shortwave transmission site in PNG's neighbouring region and broadcast an effective, nationwide service for a number of hours each day.



Regional offshore transmission: with funding from Australia or another international partner, offshore shortwave transmission sites could be used to broadcast a nationwide service into Papua New Guinea.

One potential site is in North Queensland. Until 2015, the Brandon facility outside Townsville was the site for ABC Radio Australia services focused on PNG and the Pacific. While these services were subsequently transferred to another site in Victoria (before the services ended in 2017), the Brandon site remains available to host new services. The site's owner and operator, BAI Communications, is the

primary transmission provider to Australian broadcasters ABC and SBS. In a submission to a 2017 government inquiry, the company flagged the site as the best for any future services to the region.²⁵

The site has already proved its effectiveness. In 2015, a special service was broadcast to PNG from Brandon while the country hosted the Pacific Games. Those associated with the broadcast reported significant positive response from listeners across PNG and the wider region.²⁶

Broadcasting from Brandon has a number of immediate positives: the site is available, with reliable power supplies and relevant operational expertise. NBC's services are already available for downlink via satellite for retransmission. However, sourcing equipment and installation could take time, and commercial terms would need to be negotiated. Quick action will be needed to determine whether a service can be established by the end of 2021.

Alternatives in the short term could be found in another site in the Pacific region, for example by leasing transmitter space from another broadcast operator, potentially in Guam or Singapore.

Establishing such a service on a trial basis for a limited period would allow for audience and technical surveys, and determine the viability of providing the service on an ongoing basis. It would also provide a test-bed for new digital technologies such as DRM to establish whether potential future technology could be deployed in PNG. Such a service could cost as little as AU\$3 million for a three year period. The trial outcomes could then inform decisions about investments in broadcast infrastructure and potential consolidation within the sector.

In 2015, a special service was broadcast to PNG from Brandon while the country hosted the Pacific Games.

A FUTURE TRANSMISSION STRATEGY FOR NBC RADIO

NBC's focus on medium-wave to drive better coverage will benefit audiences especially in remote and rural areas.

Looking beyond the immediate challenge of the 2022 election, NBC will need to continue expanding its transmission capability if it is to meet its medium-term goal of national coverage by 2030. NBC has been pursuing this target by rehabilitating dormant medium-wave sites as the first step towards achieving wider national coverage.²⁷ This will be a costly process in terms of the capital investment required and also the ongoing operational expense it will demand. To ensure the investment is sustainable, NBC will need to review its existing operational structure and make changes that align its transmission strategy with its operational, production, and staffing profile.

First steps towards a new transmission strategy

NBC has successfully sought and obtained additional capital investment from PNG's government to pursue studio and transmitter upgrades.²⁸ Medium-wave transmitter sites have been integral to NBC's transmission system in the past, and the new strategy recognises their importance in serving the widest possible audiences. But as noted earlier, medium-wave sites are also capital intensive, maintenance-heavy, and operationally expensive to run.

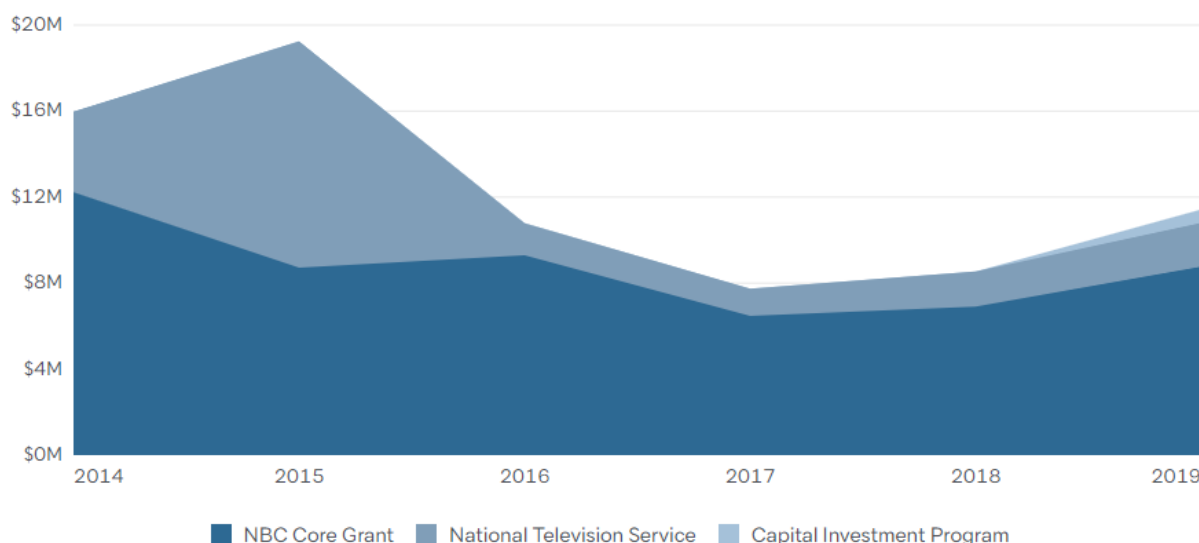
The first site that NBC has been redeveloping is at Fimito, outside Goroka in PNG's Eastern Highlands province. The site was initially developed in the late 1960s by the Australian territorial administration for the then-ABC's services in PNG.²⁹ It has been out of operation for many years, but can theoretically provide AM coverage to a large area, potentially even to the coast at Madang, and much of the surrounding highlands region.³⁰ The transmitter upgrade works were recently completed and officially launched.³¹

NBC's focus on medium-wave to drive better coverage will benefit audiences especially in remote and rural areas. NBC management has also indicated that Fimito is a first step in rehabilitating other similar sites with a goal of lifting coverage.³²

Yet re-establishing such sites will be a financial challenge for the corporation. Medium-wave transmitters are heavy users of electricity. The successful rehabilitation of a transmitter will immediately increase operational costs for NBC through additional electricity expense — and therefore place an immediate burden on its cashflow. While PNG's

government has been positively inclined to support capital projects, there is no sign that it is prepared to extend further operational funding support to NBC. Therefore, each transmitter that is restored will use funds that are currently supporting other activities.

Investment into Papua New Guinea's National Broadcasting Corporation (AU\$)



Source: PNG government, Budget papers, 2015–2021.

Note: AU\$ amounts converted at Reserve Bank of Australia average annual exchange rates.

Such new capital investments will require that NBC look for operational savings and alternative income to keep re-established and critical transmitter sites on air. While NBC accepts advertising, the rural and remote audiences that will benefit from its expanded reach are unlikely to be especially attractive to advertisers in terms of revenue. Therefore, in the absence of an increase in government grants, it will need to save costs from its existing operations to devote to these operational expenses.

A regional broadcasting model

As discussed earlier, existing NBC radio services are structured in a complex and operationally expensive model with provincial radio stations in each of PNG's 22 provinces. Only Jiwaka and Hela provinces — created in 2012 — are yet to host a local station.³³ In practice, many provincial stations struggle to remain operational with limited funding

and disputes between national and provincial governments over responsibility.

Significant support would be needed to help NBC adapt and change to a new model of operation.

Planning ahead, NBC should aim to reconfigure its provincial operations into more efficient broadcast zones based around PNG's administrative regions of Highlands, Islands, Momase, and Southern. A cross-province transmission network focused on these regions could be serviced by full-function radio studios in four major centres — for example Mount Hagen, Kokopo, Port Moresby, and Lae— and then supported by the continued presence of field reporters and news journalists in each province, with content and material fed from provincial offices back to the regional hubs.

Making such a change would free up significant resources and time: no longer would technical staff need to maintain transmitters and studios at each site in each province. Staff would be freed to become content gatherers and makers rather than attending to transmitter maintenance, studio operations, and administration. There need not be any loss of NBC presence in each centre, as local staffing would be maintained.

Cross-province identities in each region could be strengthened and communities of interest would be maintained. This regional focus would also bolster NBC's national capabilities as better resourced regions feed better quality content into national programming.

However, such a change would present its own challenges. There would be the primary challenge of pursuing organisational change within NBC, with obstacles in terms of management capacity and organisational resistance. Significant support would be needed to help NBC adapt and change to a new model of operation.

From outside, too, there would be issues: provincial governments expect they should have a local NBC station of their own and many would resist losing their local station in favour of a regional configuration. Nevertheless, there are clear benefits to them in this model: it would provide a more reliable — if regional — service, one that gives an opportunity for provincial voices to be heard in a regional and national context.

THE FUTURE OF PNG BROADCASTING

Beyond stabilising and consolidating NBC's existing broadcasting resources, the public broadcaster will need support to manage its transition away from traditional broadcasting towards digital and other online and on-demand services. NBC will also need support to remain the key bridge between the haves and have-nots in the country's 'digital divide'.

The 2019 survey of PNG audience behaviours shows that digital services are already becoming dominant in audiences' media diets.³⁴ Growth at present is concentrated in urban centres where connectivity is better, but as more bandwidth becomes available in future years, more users with financial and technical access will migrate to alternative platforms. Those without this choice will be left behind. They will become increasingly reliant on legacy broadcast services at the same time as advertising revenue for these platforms decreases due to shrinking audiences.

NBC, along with other PNG broadcasters, will need support to weather this transition. Broadcasters will need to wring efficiencies from their operations to maintain their legacy broadcast services at their lowest possible financial cost while increasing spending to maintain and grow audiences on emerging platforms.

The opportunity for NBC and other PNG broadcasters is to look at infrastructure sharing, multiplexing, and collaboration to minimise costs and at the same time improve coverage, especially for these 'disconnected' users. The fact that three of the major entities in the broadcast industry (EMTV, FM100/Kalang and NBC) are directly owned by the PNG government provides a significant opportunity for consolidation and rationalisation.

Internationally, many broadcasters have divested themselves of the infrastructure side of their businesses. Public broadcasters such as the BBC³⁵ and TVNZ have privatised their distribution networks, while in Australia the separately-managed government transmission network for ABC and SBS services was corporatised and then privatised in the 1990s.³⁶

NBC, along with other PNG broadcasters, will need support to weather this transition.

PNG's public broadcaster plays a critical role in the country's democratic system and must be strengthened in time for the coming national elections in 2022.

Such models may not be directly applicable to PNG, but there are clear opportunities to minimise further spending on transmitter sites between broadcasters.

Recent experience with the rapid and successful deployment of mobile telephone technology in PNG suggests that older notions of the financial viability of such investments need revisiting. An appropriate mix of entrepreneurship and expertise could deliver better results for broadcasters and for audiences. Potential corporate entities that may manage these infrastructure services could prove to be attractive investments for long-term investors such as superannuation funds.

As PNG's largest broadcaster, with the control and ownership of the largest number of existing transmission sites, NBC should be central to a detailed consideration of these issues by the PNG government and the industry more broadly. Current policies to encourage digital television transition³⁷ and to investigate media ownership laws³⁸ also provide a framework to facilitate such a discussion.

NBC should be supported to explore these opportunities and identify potential structures that can ensure its ongoing financial and technical success at the lowest possible cost, while encouraging potential investors in the provision of broadcast infrastructure to be part of that conversation.

CONCLUSION

PNG's public broadcaster plays a critical role in the country's democratic system and must be strengthened in time for the coming national elections in 2022. Following those elections, opportunities for NBC to reconfigure and rationalise its operations offer the most efficient way to realise the resources needed to make its services sustainable. NBC should also work with other PNG media outlets to assist in its nationwide coverage and improve the nation's essential information architecture. Equally, PNG's international partners and donors must do more to bolster this national institution, and must do so urgently. Additional support will be essential for NBC to fulfil its vital role as the bridge between 'disconnected' PNG citizens and the rest of the nation.

NOTES

Banner image: The people of the Trobriand Islands have limited access to television, radio, and the internet. As part of their traditional oral culture, they use string figures to tell stories of people, animals, and spirits (Image: Eric Lafforgue/Gamma-Rapho via Getty Images).

- ¹ Nigel Fry, "Pushing the Frontiers with Digital Radio Mondiale", EBU, Digital Radio Summit 2021, 17 February 2021, <https://tech.ebu.ch/contents/publications/presentations/2021/drs2021/pushing-the-frontiers-with-digital-radio-mondiale.html>.
- ² "Explanatory Statement in Relation to a Scheme of Arrangement between Digicel Group One Limited and The DGL1 Scheme Creditors", 15 May 2020, 341, <https://document.epiq11.com/document/getdocumentbycode/?docId=3661161&projectCode=DCE&source=DM>.
- ³ Catherine Highet, Michael Nique, Amanda Watson, and Amber Wilson, "Digital Transformation: The Role of Mobile Technology in Papua New Guinea", GSM Association, March 2019, 20, <https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2019/03/Digital-Transformation-The-Role-of-Mobile-Technology-in-Papua-New-Guinea.pdf>.
- ⁴ Annmaree O'Keeffe, Will Paxton, and Moale Vagikapi, "Media Development Initiative: Independent Review", PNG Quality and Technical Assurance Group, August 2020, <https://www.dfat.gov.au/sites/default/files/mdi-review-final-report.pdf>.
- ⁵ Department of Foreign Affairs and Trade, "Independent Evaluation Report: Papua New Guinea Media for Development Initiative", March 2012, 15, <https://www.dfat.gov.au/sites/default/files/png-mdi-independent-evaluation-report.pdf>.
- ⁶ World Bank, "Population, total – Papua New Guinea", <https://data.worldbank.org/indicator/SP.POP.TOTL?locations=PG>.
- ⁷ National Statistical Office of Papua New Guinea, "Papua New Guinea 2011 National Report", 48, <https://png-data.sprep.org/dataset/2011-census-report>.
- ⁸ Scott Morrison, "The Papua New Guinea Electrification Partnership", 18 November 2018, <https://www.pm.gov.au/media/papua-new-guinea-electrification-partnership>.
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- ¹⁰ Ian Ling-Stuckey, "2020 Budget Estimates for Statutory Authorities, Provincial Governments, Debt Services, and Trust Accounts for the Year Ending 31 December 2020", https://www.treasury.gov.pg/html/national_budget/files/2020/Volume%202d.pdf.
- ¹¹ "Masiu: 11pc of Population on FB", *The National*, 22 June 2021, <https://www.thenational.com.pg/masiu11pc-of-population-on-fb/>.

- ¹² ABC International Development, 28, <https://www.abc.net.au/abc-international-development/png-citizen-perceptions-of-governance-and-media-engagement-stud/12549648>.
- ¹³ Official data on the state of NBC's transmission network is not available. This is the author's assertion based on conversations with experienced broadcast industry figures in PNG.
- ¹⁴ Julia Daia Bore, "Judge Rules against NBC in Land Battle", *The National*, 22 February 2010, <https://www.thenational.com.pg/judge-rules-against-nbc-in-land-battle/>.
- ¹⁵ Fidelis Sukina, "Local Company Claims Independence Boulevard as It [sic] Brainchild", EMTV, 20 October 2018, <https://emtv.com.pg/local-company-claims-independence-boulevard-as-it-brainchild/>.
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ABOUT THE AUTHOR



Shane McLeod

Shane McLeod is a Research Fellow working with the Lowy Institute's Australia-PNG Network.

Before joining the Institute, he was a senior editor at ABC News in roles where he managed its Sydney newsroom and the flagship radio programs *AM*, *The World Today*, and *PM*. He is a former foreign correspondent with postings in Japan and Papua New Guinea, as well as reporting assignments throughout the Asia-Pacific region. He has also worked as a journalist in regional Queensland, Melbourne, Sydney, and Canberra.

smcleod@lowyinstitute.org

LOWY INSTITUTE

31 Bligh Street
Sydney NSW 2000

Tel. +61 2 8238 9000
Fax +61 2 8238 9005

lowyinstitute.org
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