INVESTING FOR SUSTAINABLE GLOBAL FISHERIES

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Bloomberg Philanthropies’ Vibrant Oceans Initiative
The Rockefeller Foundation
Executive Summary

Introduction

Small-Scale Fisheries Investment Blueprints
The Mariscos Strategy
The Mangue Strategy
The Isda Strategy

Industrial-Scale Fisheries Investment Blueprints
The Merluza Strategy
The Sapo Strategy

National-Scale Fisheries Investment Blueprint
The Nexus Blue Strategy
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NATIONAL-SCALE FISHERIES INVESTMENT THESIS
THE NATIONAL-SCALE FISHERIES INVESTMENT THESIS

The National Scale Fisheries Strategy employs a public-private partnership (PPP) model to finance, develop, implement, and operate the targeted infrastructure and services to address critical information gaps. Through a PPP model, private partners with sector expertise can develop and operate information and enforcement infrastructure, such as vessel monitoring systems (VMS) and electronic catch accounting, which the public sector has in many cases struggled to deliver. This data in turn can catalyze the system-wide management reforms required across the supply chain in order to protect and restore seafood resources, and offers transparency to end buyers in order to ensure that market actors as well as authorities are able to punish violators while recognizing and rewarding best practices.

These solutions are directly focused on removing key barriers to effective fisheries management at the public-sector level in order to optimize the existing resources and capabilities of governments and regional fisheries management authorities (RFMOs). The national-scale strategy looks to the key leverage points in the supply chain system where relatively small, targeted investments in infrastructure can yield significant benefits for fisheries regulators, and in turn, offer meaningful positive social and environmental impacts.

However, these public infrastructure, management, and social benefits are not easily monetized through traditional, private investment models, which in turn can deter innovative, entrepreneurial, market-based solutions. Fortunately, there is a successful precedent investment structure employed across the world to attract private capital, innovation, and operating expertise to public assets and services, such as mass transit, that would otherwise not be commercially investible. That structure is the public-private partnership, also referred to as “PPP” or “P3” investments (for those not familiar with the PPP framework, please refer to Annex C for more detail). The National-Scale Fisheries Strategy proposes adapting the PPP framework to fisheries management interventions, specifically through bundled investments in two categories:
1. Comprehensive fisheries information management systems (FIMS) packages including shore-based and on-the-water tools such as monitoring, control, and surveillance (MCS) systems, traceability systems, and electronic catch accounting;

2. The assets and operations of “brick and mortar” fishing port infrastructure at key landing and market access points.

By bundling a FIMS data management investment together with an infrastructure and operating PPP, we have identified a revenue stream to support the public good provided by information access and transparency. In the case of a port, port user fees and ancillary services generate revenue at a “natural monopoly” in the supply chain, providing revenue streams necessary to structure an attractive investment.

NATIONAL-SCALE FISHERY CHALLENGES
The Encourage Capital team evaluated numerous cases of fisheries with well-intentioned regulators and a robust framework on paper. Yet these fisheries suffer from a lack of infrastructure, data, institutional capacity, and political will to empower management authorities to deliver on regulatory enforcement and other public commitments. In many cases, these infrastructure, data, governance and institutional capacity deficiencies are a fundamental barrier to implementing fisheries management policies at the national or supranational-scale. These barriers distort market incentives and are at the root cause of illegal, unregulated, and unreported (IUU) fishing. Ineffective governance infrastructure prevents effective legal enforcement of regulations of any sort. The result is a persistent “governance gap” across the world’s oceans, with an especially pernicious effect in emerging market regions with large maritime resources, such as Southeast Asia.

At the supranational level, which involves cooperation between national authorities, the challenge becomes even more pervasive and complex, and making the management of highly migratory, border-crossing fish stocks like tuna especially difficult. The result of this difficulty is the growth of IUU fishing, which threatens to undermine the efforts of the best-formed management policies, puts excessive pressure on resources, enables human rights abuses such as slave labor, and punishes compliant fishers who face declining catch volumes despite following the letter of the law.

Ultimately, information asymmetry lies at the heart of IUU fishing in many national and supranational fisheries. A lack of data and transparency prevents authorities, seafood buyers, and other well-intentioned stakeholders to access timely data on who is fishing illegally, where they are fishing, how much they are catching, and where that product is being sold. Greater control of information offers significant potential to tip this system in a positive direction, for which the growth in low-cost data collection and analytics technologies, and the ubiquitous “big data” trend, offer particularly promising solutions.
THE NEXUS BLUE STRATEGY

A NATIONAL-SCALE FISHERIES INVESTMENT IN THE PHILIPPINES
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Encourage Capital has worked with support from Bloomberg Philanthropies and The Rockefeller Foundation to develop the first sustainable fisheries public-private partnership (or “PPP”) impact investment strategy. The Nexus Blue Strategy (Nexus Blue) is a hypothetical $34.0 million PPP impact investment to improve IUU (illegal, unreported, and unregulated) enforcement and facilitate transparency and information sharing across the supply chains of these high-value products. This investment will pay for the deployment of hard and soft infrastructure to combat IUU fishing and to facilitate transparency and information sharing across the supply chains of high-value fish species. Private capital proceeds will be used to refurbish and operate the General Santos Fish Port Complex (GenSan), the largest tuna port in the Philippines, and invest in data collection and monitoring of the relevant fisheries. Proceeds will pay for hard infrastructure as well as the deployment of IT infrastructure to virtually link the downstream buyers, upstream (on-the-water) harvesters, port market actors, dockside catch accountants, national and regional fisheries authorities, and independent researchers. This “soft” infrastructure will leverage constrained fisheries management and enforcement resources far more effectively by integrating digital capabilities and applying “big data” analytics. By using the analytics and traceability tools common across nearly every other product supply chain, regulators can also harness the power of the market by arming buyers with the knowledge to punish violators while rewarding sustainable practices. Integrated PPP investments of this nature promise to eliminate the long standing information and cost barriers to strong, coordinated, multi-stakeholder fisheries management facing the “highly-migratory pelagic” fisheries of the Western and Central Pacific Ocean (WCPO).

Nexus Blue intends to achieve these objectives by upgrading strategic port infrastructure and post-harvest facilities, installing 2.4 MW in solar PV capacity, and deploying the IT hardware and software to fight IUU fishing while informing better resource management across the 429 vessel fleet actively using the port. Investors would be compensated through the ongoing collection of port fees and rental revenues under a 30-year PPP concession with the Philippine government. These measures will also ensure compliance with EU and U.S. demands for monitoring, control and surveillance (MCS) and chain-of-custody to address the scourge of IUU fishing in the region. The poor, highly-vulnerable nearshore fishers who are directly harmed by the illegal fishing operations that poach fish from their local waters stand to benefit from a share of the $620 million that IUU fishing costs the Philippines alone each year. The Nexus Blue Strategy targets a 15.0% blended IRR and 22.3% equity IRR for investors over a 33-year term (including a 3-year construction & implementation period in addition to the 30-year concession.)

1 Southeast Asian Fisheries Development Center, Fish for the People, Vol. 8, No.1, 2010, page 11.
2 The sponsor IRR (internal rate of return) of a SPV under a PPP structure considers that the sponsors are generally expected to commit junior or mezzanine debt to the capital structure in addition to their equity investment; the “blended” IRR accounts for the multiple types of securities that project sponsors invest into an SPV such as NexusCo, and the interest, repayment and dividends received by sponsors after servicing the Senior commercial bank project loans.
THE NEXUS BLUE STRATEGY
The Nexus Blue Partnership Strategy (Nexus Blue) is a hypothetical $34.0 million public-private partnership investment structure to finance and implement targeted infrastructure and IT solutions that enable management reforms throughout the supply chain of the Philippines’ high-value regional tuna fisheries. This strategy targets the operations and infrastructure of the General Santos Fish Port Complex (GenSan), which serves as a platform for investment in a comprehensive fisheries information management system (FIMS) PPP. The GenSan port functions as a “bridge” between on-the-water production and high value export markets, and offers a natural leverage point in the otherwise complex and diffuse supply chain.

Over 90% of total fish landings at GenSan are sourced from highly migratory, regional tuna populations. Strong national, regional and international regulations and standards do exist to govern these stocks, at least on paper. Fisheries authorities, however, are often unable to implement and enforce existing laws. The reasons for this vary, but include budgetary constraints, industry opposition, the common-resource nature of the sea, and limited data. However, for the first time, this lack of effective regulation is beginning to have an impact on industry as well, and governments are taking notice. Top international market destinations, led by the European Union, are demanding fisheries management reform, compliance with international IUU commitments, and transparency across the supply chain. In April of 2014, the European Community issued a ‘yellow-card’ warning to the Philippines because of the high incidence of IUU fishing and lack of regulatory control over fisheries, which threatened to restrict access to the EU, a $164 million annual export market for Philippine tuna products. The Philippines government quickly took action and passed legislation to address its fishery management deficiencies, and as a result, the European Commission lifted the Yellow-Card warning in April 2015. However, serious questions remain as to how to implement these new legislative requirements.

Nexus Blue’s FIMS component would integrate with the Philippine National Stock Assessment Program (NSAP), and deliver critical data to the Western Central Pacific Fisheries Commission (WCPFC), which manages highly migratory fish stocks across the region. The GenSan port modernization component would restore the facility while making improvements to sanitation, markets, and post-harvest facilities. The modernization initiative would also install solar power generation capable of meeting over 50% of the upgraded port’s power needs and build 3,000 tons of new cold storage capacity, while increasing operational efficiencies and building shore-based governance capabilities. As the only port certified to export product to the EU and U.S., GenSan represents a critical path to market that the Philippine commercial fishing industry cannot ignore, and that buyers can look to with confidence and transparency.

While the Nexus Blue Strategy alone cannot expect to directly cause fish stock recoveries, especially in the short-term, it would aim to catalyze positive reform momentum and provide the foundation for sustainable fisheries management. This would include an effort to secure the commitment of Philippine fisheries authorities to complete implementation of fishery-wide vessel registration and establish maximum catch limits for the tuna and sardine fisheries as a part of the PPP process. Nexus Blue has the potential to generate stable and attractive financial returns, targeting a 15.0% blended sponsor IRR in the base case, with equity returns of 22.3% over an assumed 33-year total investment term. Finally, Nexus Blue can provide a novel, replicable model for public-private partnerships focused on national scale fisheries management improvements across the region and beyond.
**Direct Impact and Financial Returns**

- Creates a best-in-class data collection and management system in partnership with the Philippines government capable of electronic monitoring and reporting, traceability, and near real-time data transmission covering 429 vessels.
- Addresses EU requirements for Vessel Monitoring Systems (VMS), traceability, and reporting, while informing regional stock assessments with improved catch accounting.
- Ensures that 100% of the product passing through GenSan is legally sourced and accounted for.
- Increases crew welfare by providing electronic communications and internet access.
- Targets a 15.3% blended IRR and a 22.3% levered equity IRR over a 33-year investment period.

**Indirect Impact Returns**

- Provides the foundation necessary to establish and implement science-based catch limits across Philippine fisheries.
- Benefits vulnerable small-scale fishers by protecting their local fisheries resources from outside poachers.
- Offers authorities the tools to stamp out slavery and child labor practices.
- Removes key barriers to migratory fish stock restoration and management improvements in the Philippines.
- Serves as a model for replication throughout the region and broader ecosystem.

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**KEY VALUE DRIVERS**

The Nexus Blue Strategy’s value proposition centers on a public sector concession to a private sector partner to renovate, build, operate and maintain key strategic public assets in the seafood supply chain and support monitoring and enforcement of fisheries regulations. The key drivers of cash flow would be user fees, increased product throughput, operating efficiencies, novel technologies and enhanced value provided by post-harvest infrastructure upgrades. Data infrastructure both onsite and deployed across vessels using the port will satisfy currently unmet governance needs and will be funded through revenue generated at the port. The table below summarizes the key value drivers supporting the Nexus Blue investment thesis:

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<tr>
<th>HIGHLIGHT</th>
<th>DETAILS</th>
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<tbody>
<tr>
<td>Incentive alignment with industry</td>
<td>Nexus Blue endeavors to finance the on-the-water IT and monitoring infrastructure for industry, while providing improved port landings, market and post-harvest infrastructure. Port renovations and improved operations will enhance product value, with the ultimate goal of developing a “brand” around GenSan via product validation and differentiation for seafood producers sourcing raw materials from GenSan.</td>
</tr>
<tr>
<td>Leverages strong regulatory enabling conditions</td>
<td>Nexus Blue will significantly enhance the Philippine fisheries management framework and lay a foundation to catalyze management improvements in other threatened national fisheries.</td>
</tr>
<tr>
<td>Uses innovations to increase fisher compliance</td>
<td>The use of on-board data capture technologies, dockside catch accounting, and other data systems in combination with financial market incentives to reward fishers for sustainable practices can increase fisher compliance with fisheries management improvements.</td>
</tr>
<tr>
<td>Establishes best-in-class partnerships</td>
<td>The project links FIMS solutions to regional partners and fisheries management organizations, and partners with existing initiatives such as the USAID OCEANS Project to expand the fisheries data management platform across the region.</td>
</tr>
<tr>
<td>Leverages natural monopoly for access to high value export markets</td>
<td>GenSan is the only Philippine port certified for EU and U.S. export, providing important market access.</td>
</tr>
<tr>
<td>Positive investment climate</td>
<td>The Philippines is currently considered one of the most attractive foreign investment destinations in the region, and its sovereign credit rating by all three major rating agencies has been steadily improving.</td>
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PROFILE OF THE NEXUS BLUE STRATEGY FISHERY

The Philippines is an island nation in the heart of Southeast Asia populated by 100 million people and composed of over 7,000 islands situated in the western Pacific Ocean. Located at the apex of the Coral Triangle and encompassing most of the Sulu-Celebes Sea Large Marine Ecosystem, the Philippines’ seas are a hotspot of marine biodiversity spanning over 2 million square kilometers and containing nearly 60,000 square kilometers of coral reef habitat (Figure 1).3 4

Fishing is culturally, economically, socially, and ecologically important to the Philippines. Millions of Filipinos depend on the health and productivity of the coastal and marine environments for their livelihoods and food security, where seafood accounts for more than 56% of the total animal protein consumed in the country. Philippine citizens consume 30 to 60 g per day of seafood,5 significantly higher than the global average of 17 g per day.6 In 2013, the Philippines reported 2.3 million tons of total marine fish capture, ranking second after Indonesia in the Southeast Asia region, and 11th worldwide.7

FIGURE 1: Philippines Fisheries Snapshot

3 Ibid. pg. 2
4 Burke et al. “Reefs at Risk Revisited,” World Resources Institute, 2011.
In spite of well-formulated fisheries management policies, stocks have been declining overall within Philippines waters. The reasons for this vary, but all illustrate the need to effectively manage this critical resource and enable more consistent, more accurate, and lower-cost long-term data capture to better monitor the status of the stock and the actors harvesting it. Given the importance of the country’s fishing industry, declining fish stocks pose a significant challenge. Literature on Philippines fisheries cites a number of common reasons for overfishing and stock collapse, including:

- Open access fishing with a lack of management, regulation, and enforcement
- Technological advances (e.g., more efficient gear; larger nets; electronic fishing devices)
- Increase in fishing efficiency and capture potential
- Economic development policies of governments
- Growing human population
- Increase in fish prices for a growing global market
- Overfishing and excessive fishing pressure
- Inappropriate exploitation; post-harvest losses
- Habitat degradation
- Lack of technical/human resources, including monitoring and data collection and management
- Environmental conditions (e.g., climate change, poor water quality)

STOCK PROFILE AND CURRENT STATUS
The Philippines is strategically located along the so-called “tuna highway” (see Figure 2), a corridor for highly migratory pelagic species that runs from the Indian Ocean to the Western and Central Pacific Ocean (WCPO). Because the stocks are highly migratory and do not fall within the jurisdiction of a single state, they are managed by the Western and Central Pacific Fisheries Commission (WCPFC). The WCPFC is a regional fisheries management organization (RFMO) established by the “Convention for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean” (WCPF Convention), which was implemented on June 19, 2004.

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9 Ibid.
10 Ibid.
11 Pelagic fish are those that live within the water column of coastal, ocean, and lake waters, but not on or near the bottom.
The species of particular concern to this strategy are primarily the commercial tuna, specifically Yellowfin \((Thunnus albacares)\), Bigeye \((Thunnus obesus)\), Albacore \((Thunnus alalunga)\), Skipjack \((Katsuwonus pelamis)\), Frigate Tuna \((Auxis thazard thazard)\) (Figure 3). Other commercial fish caught in these waters include billfish such as Black Marlin \((Makaira indica)\), Striped Marlin \((Tetrapurus audax)\), Blue Marlin \((Makaira nigricans)\), and Swordfish \((Xiphias gladius)\) (Figure 4). All of these species are highly migratory, and travel thousands of miles spanning the waters of multiple countries to feed and reproduce. As a result, stocks cover a wide geographic distribution at any given time, and do not remain within the Philippines’ 200-mile national exclusive economic zone (EEZ).
The WCPFC oversees the world’s largest tuna fisheries, with over 2.8 million metric tons (mt) of commercial tuna landed in 2014. This is over 30% greater than the entire volume of landings in the Indian Ocean, Atlantic Ocean and Eastern Pacific Ocean combined. The landings sourced from within just the exclusive economic zones (EEZs)\(^2\) of island nations in the WCPFC such as Kiribati, Papua New Guinea, and Indonesia are nearly as large, or larger, than the entire volumes landed from the world’s other major tuna-producing oceans (Figure 5).

**WCPFC STOCK STATUS**

The status of key tuna stocks in the WCPO is relatively robust, with the exception of bigeye, which is widely recognized as overexploited relative to its stock size (see Figure 6). In addition to bigeye overfishing, there are serious problems of IUU fishing, juvenile catch, and bycatch.\(^3\)

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\(^2\) An exclusive economic zone (EEZ) is a maritime zone defined under the United Nations Convention on the Law of the Sea (UNCLOS) as that which a state has rights over regarding the exploration and use of marine resources, stretched perpendicular to the coastline out to 200 nautical miles from the coast.

While the primary tuna species, including the yellowfin, albacore, frigate, and skipjack tunas, are not overexploited within the WCPFC region as a whole, localized overfishing is occurring in areas across the region, including within the Philippines EEZ. Bigeye stocks, however, are threatened throughout the WCPFC waters, largely a result of juvenile harvest by purse seine and ring net gear (Figure 6). Moreover, with landings increasing substantially over the past several decades, the spawning stock biomass\textsuperscript{14} of yellowfin, albacore, and bigeye has declined (Figure 7). At the global level, a recent report found that the global index for \textit{Scrombidae}, the family of mackerels, tunas, and bonitos, declined by 74\% between 1970 and 2010, and many tuna fisheries worldwide are under threat (Figure 8).\textsuperscript{15}

\textbf{STATUS OF KEY TUNA STOCKS}

![Diagram of status of key tuna stocks](image)

Source: SPC (Secretariat of the Pacific Community), 2015.

\textsuperscript{14} Spawning Stock Biomass (SSB) is the biomass of mature, reproductive individuals in the population.


\textsuperscript{16} The health of a fish stock is primarily a function of two components: 1) the current size of the stock's biomass relative to a theoretical sustainable maximum or minimum stock size (shown here as the ratio of current spawning stock biomass to the spawning stock biomass at maximum sustainable yield, or SSB/SSB_{MSY}), and 2) the current fishing effort relative to the maximum sustainable yield (E/F_{MSY}). The lower right-hand quadrant of Figure 6 indicates sustainable stock size and fishing effort at or below MSY, suggesting favorable long-term outcomes, while the upper left-hand quadrant indicates depleted stock size and fishing effort above MSY, which suggests that the stock has either collapsed or is at risk of collapse.
FIGURE 7: Time Series of Commercial Tuna Species Spawning Biomass in the WCPFC

Source: SPC, 2015.

FIGURE 8: Stock Status of Selected Global Tuna Fisheries as of 2014

<table>
<thead>
<tr>
<th>OCEAN</th>
<th>RFMO</th>
<th>BIGEYE</th>
<th>YELLOWFIN</th>
<th>SKIPJACK</th>
<th>ALBACORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indian</td>
<td>ITOC</td>
<td>Moderately Exploited</td>
<td>Moderately Exploited</td>
<td>Moderately Exploited</td>
<td>Moderately Exploited</td>
</tr>
<tr>
<td>Eastern Pacific</td>
<td>IATTC</td>
<td>Overfished</td>
<td>Fully Exploited</td>
<td>Moderately Exploited</td>
<td>Moderately Exploited</td>
</tr>
<tr>
<td>Western &amp; Central Pacific</td>
<td>WCPFC</td>
<td>Overfished</td>
<td>Moderately Exploited</td>
<td>Moderately Exploited</td>
<td>Moderately Exploited</td>
</tr>
<tr>
<td>Atlantic</td>
<td>ICCAT</td>
<td>Moderately Exploited</td>
<td>Overfished</td>
<td>Moderately Exploited</td>
<td>Overfished</td>
</tr>
</tbody>
</table>

Source: www.atuna.com

17 “Moderately Exploited” – stock is being fished below MSY (replacement level), not currently in danger of overfishing;
“Fully Exploited” – stocks are being fished up to MSY and cannot withstand any additional fishing pressure;
“Overfished” – stocks are being fished at levels above MSY, leading to short-term stock depletion and the possibility of stock collapse.
THE PHILIPPINES’ ROLE IN THE WCPO

As of 2015, WCPFC reported 835 vessels registered under the Philippine flag, which is 14.7% of the regional total. The Secretariat of the Pacific Community (SPC) Regional Tuna Fishery Database registered 29 Philippine flag purse seine vessels in other Pacific Island countries’ waters in 2014.\textsuperscript{18}

Philippines vessels registered under the WCPFC include bunker vessels, fish carrier vessels, handline vessels, longline vessels, “mothership” aggregating vessels, purse seine vessels, multipurpose vessels, and support vessels, with over 75% falling under 250 gross ton (gt) in weight, and 12% exceeding 500 gt (Figure 9).\textsuperscript{18, 20}

The Philippines is among the world’s top tuna producers, representing approximately 10% of total landings in within the WCPO, landing nearly 16% of yellowfin tuna in the region by volume.

Among Philippines regulatory agencies, the Bureau of Fisheries and Aquatic Resources (BFAR) is the primary organization for designing, implementing, and collating catch accounting systems in the Philippines, and is the national counterpart to the WCPFC when inputting to regional stock assessments.


\textsuperscript{19} Ibid.

STOCK STATUS AND THREATS WITHIN PHILIPPINES WATERS

While regional fish stocks across the WCPFC are currently not considered overfished (with the exception of bigeye tuna), the state of these species within Philippines waters is indicating signs of strain. Yellowfin tuna is considered fully exploited\(^1\) and skipjack tuna moderately to fully exploited, while Catch-Per-Unit-Effort (CPUE) has been falling over time (See Figure 10).\(^2\)

Since 1950, the catch per unit effort of Philippines fisheries has fallen dramatically. Recent data suggests current CPUE levels are nearly 1/10th the levels they were prior to 1950. This indicates overexploitation of fish populations by increasing number of fishers, despite dramatic improvements in technology.

FIGURE 10: Trend of Catch Per Unit Effort (Tons Per Horsepower (mt/Hp)) for Municipal Small Pelagic Fisheries in the Philippines Since 1948

\(\text{CPUE: mt/HP} \)
\(\begin{array}{c|c|c|c}
1950 & 1 & 2 & 3 \\
1960 & & & \\
1970 & & & \\
1980 & & & \\
1990 & & & \\
2000 & & & \\
\end{array}\)

Since 1950 a clear trend has emerged where catch per unit of effort has dropped nearly 50% decade on decade


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\(^1\) Gross ton is a unit of a ship’s internal-storage capacity, equal to 100 cubic feet (2.83 cubic meters).
STOCK MANAGEMENT APPROACH AND CHALLENGES

REGIONAL REGULATORY CONTEXT FOR HIGHLY MIGRATORY STOCKS

The Western and Central Pacific Fisheries Commission’s (WCPFC) mandate is to address challenges to the sustainable management of high seas and regional fisheries. The Commission’s specific responsibilities include developing and managing a framework that legally binds participating private fishing entities to fisheries management compliance, secures multilateral state participation, adapts to the unique needs of developing countries and enables cooperation with other Regional Fisheries Management Organizations (RFMOs) whose work and/or species under management overlap with those of the WCPFC.

The species covered under the WCPFC Convention are albacore bigeye, skipjack, yellowfin, black marlin, blue marlin, striped marlin, and swordfish. In partnership with member states, the WCPFC also collects data on certain shark species. Catches and discards of other species are not considered under the WCPFC framework. The industrial fishing gear types used in the WCPFC region primarily include pole and line, longline, purse seine, and trawl, and those vessels that are either flagged to participating nations or “chartered” foreign vessels fall under the WCPFC Convention.

PHILIPPINE NATIONAL FISHERIES REGULATORY CONTEXT

Philippine fisheries are governed at both the national and local levels, and national regulators collaborate with regional fisheries management organizations (RFMOs) in the case of highly migratory species like tuna.

At the national level, fisheries management and enforcement falls under the jurisdic- tion of the Department of Agriculture’s (DA) Bureau of Fisheries and Aquatic Resources (BFAR). The BFAR’s mandate includes issuing licenses and permits according to the principle of Maximum Sustainable Yield (MSY), establishing strategies with the private sector to ensure sustainable use of fishery resources, establishing and maintaining a fishery information system, coordinating marketing activities, and formulating rules to conserve highly migratory, multi-jurisdictional species. The BFAR and the National Fisheries Research and Development Institute (NFRDI) are the main organizations responsible for designing, implementing and collating catch accounting systems within country’s EEZ, as well as activities involving domestic-flagged vessels product landed in the Philippines. The DA’s Philippine Fisheries Development Authority (PFDA) is tasked with promoting the fishing industry’s growth and managing critical public supply chain and logistics infrastructure. The PFDA’s responsibilities consist primarily of operating and investing in the construction and maintenance of regional commercial fishing ports and post-harvest facilities to improve handling, storage, marketing, and distribution of seafood products. The PFDA currently owns and operates GenSan and seven other regional fish port complexes across the country.

Further layers of governance fall at the provincial, municipal (called Local Government Units, or LGUs), and “barangay” (village) level. Management efforts at these levels are supported by key research agencies including the NFRDI, the NSAP, and the Bureau of Agricultural Statistics (BAS).

THE PRINCIPAL OF TOTAL ALLOWABLE CATCH

In theory, the Philippines Fisheries Code 1998 operates on a principle of a Total Allowable Catch (TAC) ceiling set below the Maximum Sustainable Yield (MSY) for the species. These benchmarks were established through robust data collection and stock assessments, in accordance with regional and international fisheries laws such as the UN Convention on the Law of the Sea (UNCLOS), the UN Fish Stocks Agreement (UNFSA) and the FAOs International Plan of Action on IUU Fishing (IPOA-IUU). BFAR and the NFRDI cooperate with RFMOs such as the WCPFC to inform the regional stock status of highly migratory species, set TAC levels, and manage effort limits.

Fisheries data for use in the stock assessment process is collected primarily through regular port sampling conducted under the National Stock Assessment Program in major landing sites. Currently, BFAR is using paper-based log sheets which results in significant delays in data transmission (between three months and a year), input errors, added labor and administrative costs, and poor data integrity. However, 20 purse seine vessels in the Philippines are now using the Collected Localization Satellites (CLS) and Marine Logbook Information (MARLIN) electronic logbook system, and BFAR has prioritized building its digital data collection capabilities.

FISHERIES MANAGEMENT CHALLENGES
GOVERNANCE LIMITATIONS

Despite long-standing and recent efforts to improve fisheries management, the Philippines fisheries governance system ranks 21st out of the top 28 fish-producing countries that deliver 80% of global seafood supplies. Recent research published by the Ocean Prosperity Roadmap ranks countries across four critical aspects of effective fisheries management: research capability, management capacity, and enforcement. Nearly in the bottom quartile, the Philippines scores low on the index relative to other developing country peers such as Vietnam or Mexico (Figure 11).

Likewise, the Economist Intelligence Unit’s 2015 Coastal Governance Index’s “Living Resources” category, which is heavily weighted toward fisheries management and conservation, ranked the Philippines tied for second to last of 20 countries surveyed (see Figure 12).

Source: Oceans Prosperity Roadmap.

Colored circles represent index values for each dimension separately, averaged across respondents and species for each country.

Research
Management
Enforcement
Socioeconomics

FIGURE 11: Fisheries Governance Index

Source: Oceans Prosperity Roadmap.

IUU fishing in Philippine and regional waters is considered a serious problem, especially as related to the catch of migratory pelagic species like tuna. In the Philippines alone, an estimated 460,000 mt of fish are illegally harvested each year, translating to annual economic losses of up to $620 million, or between 3% and 6% of the estimated $10 to $20 billion in annual global IUU costs.

The Philippines is party to a number of international agreements committed to countering IUU activity through better MCS, better data capture, and better traceability across the supply chain, including the UNCLOS, UNFSA and the IPOA-IUU, among others. In spite of these commitments, the Philippines has been identified as one of the nations most affected by IUU fishing, particularly related to high-value and restricted species such as tuna, reef fish, sharks, and turtles.

Due to the Philippines’ failure to meet international standards on the restraint of IUU fishing, in June 2014, the European Commission (EC) identified the Philippines as a non-cooperating Third Country. This identification is referred to as the “yellow card,” and it functions as an official warning to the Philippines to take action to improve the situation, such as amending its fisheries law or taking a more proactive approach against IUU fishing within the term of six months in order to avoid further consequence. In April 2015, the EC lifted the yellow card in recognition of the Philippines’ progress in taking steps to limit IUU fishing. However, without significant reforms in the long term, the country is liable to receive a more severe “red card” that bans all Philippines fishery exports to the European Union. This action has been taken against Guinea, Belize, and Cambodia as recently as 2014.

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29 European Commission, 2015. “Question and Answers on the EU’s fight against illegal, unreported and unregulated (IUU) fishing” Fact Sheet.
In response to growing pressure from the EU, as well as new measures proposed by the U.S. regarding IUU vessels and product in Philippines waters, the Philippine government amended its primary fisheries regulatory legislation, the “Fisheries Code of 1998”. The Philippines government passed the “Amended Fisheries Law” in April 2015, aimed at preventing, detecting and eliminating IUU fishing by addressing specific areas of deficiency and signaling its commitment to rectifying the issue.

A primary amendment was a requirement that all Philippine fishing vessels install monitoring, control, and surveillance (MCS) systems, regardless of fishing area and the final catch destination, and BFAR issued a law requiring all tuna fishing vessels to install VMS. The European Commission removed the yellow card in April of 2015, following the passage of the Amended Fisheries Law, but has said that it will carefully monitor the law’s implementation.

However, implementing the amendments will be a significant challenge for the Philippines government, which faces substantial industry opposition. In fact, the legal basis for VMS installation has existed for nearly 20 years, yet implementation and enforcement has been politically difficult. Given its inability to fulfill its MCS/VMS obligations for over nearly two decades, observers question whether it can effectively implement and enforce the recent amendments, which carry even stricter requirements for VMS compliance.

Such strong trade sanctions as those threatened by the EU would greatly affect the country’s economy, particularly in the General Santos region. As the second largest importer of Philippines fishery products in 2013, the EU imported $190 million of primarily prepared and preserved tuna. In 2012, EU exports of a single product—canned tuna—reached $123 million, representing 45% of the Philippines’ total tuna exports and over 10% of all national fisheries exports.

Other significant impacts of a failure to address the IUU situation, and threats to its ability to do so effectively, include:

**Threats to U.S. and Japanese Market Access**

The U.S. and Japan are adopting the EU’s IUU fishing stance, which aim to close their markets to IUU products. In 2012, the U.S. was the largest importer of fishery products from the Philippines, with a total imported value of $270 million, while Japan imported $123 million worth in the same year.

**Social Unrest from Commercial Fishing Community**

The Amended Fisheries Law faces mounting opposition from the fishing industry due to its strict prohibitions, including a fishing ban within 15 kilometers of Philippines municipal waters, prohibition on use of destructive gear, limits to total allowable catch, and the mandatory MCS requirement. In September 2015, more than 1,000 fishers protested against BFAR’s decision to implement the Amended Fisheries Law, and in July 2015, some 5,000 fishers and traders staged a “fishing holiday” protest in Manila Bay. In addition to concerns about MCS system installation costs’ potentially reducing fishing income, the protesters feared the risk of receiving heavy penalties from violations.

34 Republic Act (RA) No. 8550, The Philippines Fisheries Code of 1998, An act providing for the development, management and conservation of the fisheries and aquatic resources, integrating all laws pertinent thereto, and for other purposes.

35 RA 10654, An Act to prevent, deter and eliminate illegal, unreported and unregulated fishing, amending Republic Act No. 8550, otherwise known as “The Philippines Fisheries Code of 1998” and for other purposes; RA 10654 was issued on July 28, 2015, and lapsed into law on February 27, 2015.
The City of General Santos was incorporated in 1968 on the island of Mindanao at the southern extreme of the archipelago (Figure 13). The region is strategically located along major global shipping lanes, with short access to markets in Malaysia, Indonesia, Brunei, and Singapore; and benefits from a deep, natural harbor; a lack of typhoons; a favorable climate with moderate rainfall and abundant sunshine; fertile volcanic soil; and proximity to high-value tuna fishing grounds. As a result, the agro-industrial sector drives the city’s economy, and this region is the country’s largest producer of agricultural commodities. The city is also home to the General Santos Fish Port Complex (GenSan), which is the country’s second largest port by daily landings volume, leading producer of sashimi-grade tuna, and is among the world’s largest tuna ports and a major hub in the regional supply chain. There were 15,936 vessel landings at GenSan in 2014; an average of 1,328 vessels/month and 44 vessels/day. GenSan is a primary landing destination and a transshipment hub for accessing export markets including the U.S., Europe, Japan, and Australia.

CURRENT SUPPLY CHAIN AND FISH PORT THROUGHPUT

The species landed at GenSan from the regional WCPO stocks to which the Philippines has access are tunas—namely skipjack, yellowfin, albacore, and big-eye, as well as other pelagic, “tuna-like” species including marlin, swordfish, mahi-mahi, mackerels, and scad. However, tuna dominates production, earning GenSan the moniker of “Tuna Capital of the Philippines”. In 2014, 287,000 mt of tuna was landed in the Philippines, of which nearly 180,000 mt, or 63%, passed through GenSan.

The catch is dominated by three gear types—64% caught by purse seine, 16% by ringnets, and 16% by hand line—with the remainder landed by a small longline fleet of just four vessels registered by the Western and Central Pacific Fisheries Commission (WCPFC). As catch has declined within the Philippines EEZ over the

FIGURE 13: Map of the Philippines and General Santos City

36 General Santos City lies outside of the Typhoon Belt, and is surrounded by high mountains that shelter the area from storms.
past decade, Philippine vessels are traveling farther afield to find new fishing grounds. In recent years, the share of GenSan landings from the Philippines EEZ has been about 60%, while the share from Papua New Guinea’s EEZ is 36%. However, an increasing amount now comes from the “High Seas Pocket 1” (HSP1) zone, outside of any country’s EEZ. There are four main sources of fish landed at GenSan (see Figure 14):

1. **GenSan-Based handline fisheries:** Traditional bancas of 8 gt with trips of up to 15 days, landing an average of 1.5 mt of primarily large yellowfin and billfish per trip. There are issues over handling, long trip length, and chilling; and only 20% of landed catch is export-quality, and very little are sashimi-quality.

2. **GenSan-Based domestic purse seine and ring-net (chilled) fisheries:** Fish aggregating devices (FADs) fisheries catching small juvenile pelagic tunas, neritic tuna, and small pelagic fish. Fishing vessels operate for up to eight months at sea, transferring catch to carrier vessels of approximately 35 gt, which land an average of 16 mt of primarily skipjack, juvenile yellowfin, neritic tuna, and scad. The key sustainability threat from this fleet is the very small size of the juvenile yellowfin tuna caught using FADs, with 50% of individuals weighing less than 500 g (1.1 lb). The product quality is also quite variable, with considerable scope for improvement.

3. **Domestic transshipments from Philippines purse seine and ring-net (frozen) fisheries:** Refrigerated transport (reefer) vessels collect product from purse seine or ring-net vessels operating out of Manila and other Philippines ports and transport it to GenSan for processing. The fishery profile is the same as that described above for the GenSan-based domestic purse seine and ring-net vessels, and the frozen product collected from catch vessels or aggregating “mother ships” primarily include skipjack and yellowfin destined for local canneries.

4. **International transshipments of Non-Philippines purse seine catch (frozen):** Refrigerated transport (reefer) vessels collect product from purse seine or ring-net vessels operating out of international ports throughout the Western and Central Pacific Ocean (WCPO), including Papua New Guinea, Taiwan, Japan, Marshall Islands and Korea, and import skipjack and yellowfin to GenSan for processing. The fishery profile is equivalent to that described above for domestic purse seine and ring-net vessels, and the imported product is primarily skipjack and yellowfin sent to local canneries in General Santos City.

As catch has declined within the Philippines EEZ over the past decade, Philippine vessels are traveling farther afield to find new fishing grounds.

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39 HSP 1 is an area between the regional EEZs, and borders the national waters of Palau, Micronesia, Papua New Guinea, and Indonesia, areas closest to the Philippines where local tuna fishing companies frequently operate.

FIGURE 14: Current Supply Chain at the General Santos Fish Port Complex

**PHILIPPINE EEZ**
- **PHILIPPINE HANDLINE FISHERY**
  - Yellowfin tuna
  - Marlin
  - Swordfish
  - Saitfish

**OTHER PHILIPPINE FISHERIES**
- Domestically-sourced transshipment of skipjack tuna

**PHILIPPINE EEZ, HIGH SEAS, & OTHER EEZs**
- **PHILIPPINE FLAGGED PURSE SEINE & RING NET FISHERIES**
  - Skipjack
  - Eastern little tuna
  - Yellowfin tuna
  - Scads
  - Bullet tuna
  - Other large pelagics
  - Other small pelagics
  - Other spp.

**HIGH SEAS & OTHER EEZs**
- **NON-PHILIPPINE FLAGGED FISHERIES**
  - Internationally-sourced transshipment of mostly skipjack and yellowfin tuna
  - Other spp.

**GENERAL SANTOS FISHING PORT**
- MARKET 1
- MARKET 2
- MARKET 3
- WHARF 1A
- WHARF 1B

**MARKET 1**
- 26%

**MARKET 2**
- 74%
- 78%

**MARKET 3**
- 78%
- 22%
- 100%

**INTERNATIONAL DESTINATION**
- 59%

**DOMESTIC DESTINATION**
- 41%

**LOCAL CANNERIES**
- 100%

**CATCHING VESSEL**
- REEFER VESSEL
- CARRIER VESSEL
Total landings at GenSan nearly doubled during the ten years after 2004, from 94,000 mt to 193,000 mt in 2014. However, Government statistics show that throughout the Philippines, the contribution of tuna to total seafood exports has dropped, as has the total value of Philippines tuna exports, which fell from $665 million in 2013 to $460 million in 2014, a 31% year-on-year decline. Since 2010, total Philippine tuna volumes have dropped nearly 20%.

The share of tuna landings sourced by the GenSan fishing fleet (excluding frozen transshipments) has fallen as well in recent years (Figure 15). These declines are widely considered to be the result of two interrelated factors: 1) overfishing and stock decline within the Philippines EEZ, leading to decreases in catch-per-unit effort (CPUE) (Figure 16); and 2) increased restrictions placed on the ability of Philippine-flagged vessels to fish within neighboring countries’ EEZs. Indonesia in particular has been cracking down on Philippine

**FIGURE 15:** Throughput by Market Location at the General Santos Fish Port Complex (2004–2014)

![Throughput by Market Location at the General Santos Fish Port Complex (2004–2014)](chart15)

Source: PFDA in General Santos (unpublished data).

**FIGURE 16:** Catch Per Unit Effort for Purse Seiners Landing at GenSan (2006–2011)

![Catch Per Unit Effort for Purse Seiners Landing at GenSan (2006–2011)](chart16)


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vessels encroaching in its waters, and Indonesian authorities captured and sank 11 Philippine vessels originating from General Santos in 2015.

The Philippines’ role in the supply chain of WCPFC fisheries is significant, and the country is currently the second largest canned and processed tuna manufacturer in Asia, behind Thailand. The country’s tuna catch of 229,393 in 2013 comprised 33% of the country’s catch in that year, with 88,928 mt of exports worth $665 million. The primary source of export revenues came from 58,660 mt of canned tuna, while fresh, chilled and frozen tuna products were the second largest category with 2013 volumes totaling 28,808 mt. Of the 180,000 mt in total tuna landings at GenSan in 2014, the GenSan-based fishing fleet (chilled handline, purse seine and ring-net fisheries) landed only 48% of this total. The remaining 92,400 mt consisted of frozen transshiments from refrigerated “reefer” vessels carrying frozen purse seine and ring-net sourced yellowfin and skipjack sourced from other ports in the Philippines (12%) and regional imports (40%) (Figure 17). This frozen product supplies the local canneries, as the city of General Santos is home to six of the country’s seven canneries.

**HARVEST LOGISTICS**

The large commercial vessels that fish both within the Philippines EEZ and outside it will often remain at sea for several months at a time, up to as much as two years in some cases. Product is delivered to port by faster transporter, or “carrier” vessels, which can quickly bring fresh product back to port. In the case of the very large “mothership” vessels, product smaller “catch” vessels harvest product and return it to the mothership, which acts as a floating port. The mothership aggregates the product and distributes it to the carrier vessels that bring the product to land (see Figure 18). The multiple transfers of product between vessels makes traceability a challenge, and the practice is used by vessels operating illegally to effectively “launder” their product by having it aggregated at sea with legitimate catch and transported to port using legal vessels.

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Intrafish Media, 2015. Philippine tuna export value drops despite 51% hike in production.

Intrafish Media, 2015. Philippine tuna export value drops despite 51% hike in production.
EXPORT DESTINATIONS
Fresh chilled and frozen tuna products are shipped mostly to Japan, the U.S., Indonesia, Thailand, Hong Kong, and France; prepared and preserved tuna products are mainly exported to the U.S., Canada, Japan, South Africa, and Germany; and dried and smoked tuna is shipped to Australia and New Zealand. The main destinations of “super-frozen” tuna are Taiwan, Korea, and, recently, China, Japan, and Vietnam. In December 2010, National Statistics Office reports showed tuna billings being $46.2 million, an increase of 51.9% compared to the same month in 2011. In 2012, tuna export increased by 2% in volume and 3% in value compared with 2011.

PORT INFRASTRUCTURE AND CHALLENGES
The entire land surface area of GenSan is 35.8 hectares (ha), which is used for a combination of public and private sector services and of which approximately 11.5 ha are vacant lots. There are two large wharfs for very large reefer vessels, and four harbor basins with the total berth space of about 1,485 m long, which is where the smaller vessels dock. Each harbor basin has an affiliated market hall, with a total footprint of 6,000 sqm across the three markets. GenSan has two cold storage facilities with a combined capacity of 3,000 mt of storage, as well as ice-making capabilities (see Figure 19).45 There are 26 lots identified for agro-industrial purposes at the port, but only 16 are presently under lease, and of these just seven commercial lots appear to be in active use.
HARBOR BASINS

Each harbor has two types of landing facilities: a stair landing and a quay. Each basin also has different depths, or “draft,” to accommodate different-size vessels. The use of the harbor facilities is divided into sections according to the gross tonnage (gt) of vessels landed there, the type of fishing gear used, and the origin of the fishing boats’ port of call, such as Manila, other Philippines ports, or “high seas” vessels that fish virtually year-round in international waters outside of the national EEZs.46

WHARFS

Extending beyond the harbor basins are two wharfs reserved for the very large foreign and local reefer transshipment vessels of 3,000 to 4,000 gt that land the frozen skipjack and yellowfin land transshipped. Wharf 1A is where foreign reefer vessels unload imported frozen tuna for local canneries, while Wharf 1B is the unloading point for reefer transshipments from vessels based out of other Philippine ports.

COLD STORAGE

There are two refrigeration plants owned and operated by GenSan. Plant A is the original refrigeration facility, built concurrently with the port under the Overseas Economic Cooperation Fund (OECF), which has been in operation since 1998 and includes an ice making plant (60 mt/day production capacity), ice storage (30 mt capacity), an ice crusher, cold storage (1,500 mt capacity at -35 °C), a contact freezer, an air-blast freezer, and a 700 m² processing area. Plant B was financed by a Chinese loan facility, beginning operations in 2007 and features cold storage (1,500 mt)

46 Often, vessels from other ports will use GenSan instead of their port of call because of its relatively better and more hygienic facilities, better prices for sale of catch, and shorter trip to port from fishing grounds.
capacity at -35 °C), a contact freezer, an air-blast freezer, and a 1,800 m² processing area. The main clients of the refrigeration building are the fish processors, fish car operators, and refrigerated fish carrier vessels. Four companies, two in each plant, currently rent processing space.

PORT GOVERNANCE STRUCTURE
Presently the Philippines Fisheries Development Authority (PFDA) owns and operates GenSan. The PFDA falls under the Department of Agriculture, and is mandated to promote the fishing industry’s growth and improve efficiency of the handling, preserving, marketing, and distribution of seafood products through the establishment of fish ports, fish markets, and other public supply chain infrastructure. At GenSan, the PFDA assigns a Port Manager (PM) to oversee four divisions managing the daily operations of the port:

1. Market and Harbor Operations Division:
   Provides landing and marketing services to users; formulates policies and procedures for effective Harbor and Market Operations; manages market and harbor operations revenues.

2. Administrative and Finance Division:
   Manages all administrative and financial responsibilities such as accounting, record-keeping, budgeting, and human resources.

3. Engineering and Ice Plant Operations Division:
   Manages ice plant and refrigeration operations, port infrastructure management and maintenance, and capital projects.

4. Food Safety Compliance Unit:
   Responsible for developing and implementing a food safety management system with the assistance of and coordination with the Post-Harvest Division of the Bureau of Fisheries and Aquatic Resources to ensure compliance with U.S.-FDA and EU food safety standards.

THREATS TO PORT VIABILITY

GenSan cannot afford to undertake urgently needed repairs or upgrades under the current operating regime. Continuing with business as usual, GenSan is likely to follow the same path as Navotas, the country’s largest fish port, which fails to comply with international standards, cannot export product to high-value international markets, and is so far degraded as to be effectively beyond repair. Improvements to GenSan would undoubtedly have a positive impact on General Santos City’s local economy, improve livelihoods, and may help alleviate the poverty situation in Mindanao.

The operating regime for Philippines regional fishing ports has proven to be unsustainable. Insufficient income derived through port operation fees means the ports are unable to cover their growing costs as the infrastructure and buildings deteriorate with use and age. In the case of GenSan, we found revenue generation has not been maximized, and a significant portion of available land within the port boundary fence that can be leased is presently unoccupied. Furthermore, some of the area’s leased land is severely behind on on receipt of payments. Perhaps the most significant revenue concern to be identified at the port is the failure to increase port user fees. Since the port started operating in 1998, most user fees have remained unchanged while others have increased very few times. Inflation from 1998 to 2014 has seen prices in the general economy increase by 119%, and several user fees are under half the rate they would be if inflationary increases had been applied them.

The upgrade of the fishing ports into an internationally recognized standard is expected to significantly increase operational performance and sustainability; improve health, safety, hygiene, and welfare; and provide a regulatory compliant platform for export of trade.

THREATS TO PORT ECONOMIC MODEL

As indicated by the decline in the other large fishing ports in the Philippines, such as Navotas Fish Port, which have degraded beyond repair and will likely need to be replaced, the current Philippine fish port economic model has not proven to be financially sustainable over the long term. The current regime underprices the use of public infrastructure and services by not indexing all port fees to inflation. As the financial model becomes more difficult to maintain over time, costs are cut, often in the form of reduced maintenance and capital spending. This scenario can lead to a public utility “death spiral,” whereby the degradation of facilities drives users away, which further reduces the fee base and revenues, while the capital and operating costs of holding a long-lived infrastructure asset hold steady. The result is that fewer users must support the high-cost base, which leads to either continued cost cutting on maintenance and infrastructure decline, or to an increase in prices (absent an improvement in the value of services and port facilities provided to the industry), both of which may drive even more users away. This same pattern is seen with electric and gas utilities, hospitals, schools, roads, and other public-user-funded infrastructure. A public-private partnership may offer an alternative, especially with a well-structured concession that ensures that the private operator meet certain performance and upkeep requirements.

Existing Environmental Infrastructure and Waste Management Issues

The Department of Natural Resources and Environment (DENR) penalized GenSan in 2012 for violating antipollution provisions under the Philippine Clean Water Act of 2004, due to inadequate wastewater treatment and fish waste disposal. To date, rehabilitation and upgrading of the wastewater treatment plant (WWTP) is ongoing and servicing of wastewater treatment has resumed. However, discussions related to the penalty charge are ongoing, and the current deficiencies must be resolved.
Management is considering imposing fees on ships unloading wastewater to generate funds needed for maintenance and improvement of the site facility. Currently, such unloading and processing of ships’ liquid waste is free of charge.

The facility also lacks a proper disposal facility for used oil and associated wastes generated from regular maintenance operations, and since the port was first constructed these used oils and other non-biodegradable materials have been housed within the complex awaiting proper disposal. However, there is currently no plan for how to move forward.

**CURRENT FISHERIES DATA COLLECTION AND MANAGEMENT DEFICIENCIES**

The Philippines, like most of the countries in the WCPFC, collects fisheries information by hand using paper logbooks and reporting forms. Onboard observers do not submit these forms until the vessel returns to port after being at sea for three or more months at a time. This significantly delays the receipt of this vital information by fisheries managers by anywhere from six months to up to a year in some cases. It also provides leeway for *ex-post facto* changes to or manipulation of the data during the before it reaches authorities.

Because manual data must be re-entered as it is passed up the chain of authorities and to the WCPFC, sometimes as many as four times, error levels are likely very high and the quality of the data significantly degraded. The current system also hinders port-based catch accounting, and only an estimated 10% of landings at GenSan are properly enumerated. This is exacerbated by inefficient landing logistics, inadequate process management and a limited number of enumerators. Besides leading to inaccurate reporting of landings by species, these factors also compromise the quality of key biological data used in stock assessments, such as length-frequency information.
SOCIOECONOMIC CONTEXT

In 2012 approximately 22% of Philippine families lived below the poverty line, and fishers are among the poorest, with a poverty incidence of roughly 40%, up from 35% in 2003. Commercial fishers and aquaculture farmers receive the majority of the economic benefits from the country’s fish production, while small-scale nearshore fishers are the most disadvantaged. The commercial sector, which includes the vessels landing product at GenSan, has grown as a proportion of total catch over time, and commercial and aquaculture fisheries production has surpassed that of municipal fisheries, which averaged 70% of total Philippine production in the 1950s. Today, commercial fishers harvest 67%, of landings among the seven top species caught by both sectors, while municipal fishers account just for 33% (Figure 20).

With the rapid growth of its agriculture and fishing industry, General Santos City grew from a population of 86,000 in 1970 to nearly 600,000 in 2015. The demographic that makes up this population is skewed very young, with 92% under the age of 55, and 40% between the ages of 20 and 44. Half of the population is younger than 19.

Approximately 36% of the General Santos City and Sarangani region’s population lives in coastal areas. Some 52% of these coastal families engage directly in fishing (evenly split between commercial and small-scale), while another 40% are involved in related occupations such as fish vending, boat making and bait gathering.

While roughly 22% of Philippine families live below the poverty line, fishers are among the society’s poorest, with a poverty incidence of over 40%. General Santos City is relatively prosperous, with the second lowest poverty incidence in Mindanao at 14%; however, the greater Sarangani region falls well below the national average, with 39% of families living in poverty, and 19% living at subsistence levels.

The literacy rate in General Santos City grew from just 31% in 1960 to 96% in 1990, and almost 44% of the labor force holds at least a secondary level of education. While being among the poorest segment of the population, most municipal fishers are literate and 67% have achieved at least a primary education, 13% have at least some secondary education, and 9% have graduated high school.

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THE NEXUS BLUE IMPACT STRATEGY

The Nexus Blue Strategy’s fundamental objective is to dramatically improve the Fisheries Information Management System (FIMS) utilized in the Philippines’ tuna fishery to better track fishing activity, landings, bycatch, and discards, creating a rich data set for use in fisheries management activities such as stock assessment modeling, IUU enforcement, and policy development, and providing the necessary foundation for protecting and restoring stocks of globally important fisheries. Nexus Blue proposes to achieve this goal by attracting private investors to support a public-private partnership project that combines an investment into the FIMS with investment into the operation and rehabilitation of the General Santos Fish Port Complex.

The high quality data stream provided by the FIMS would support Philippine fisheries authorities in the provision of more accurate and timely data to the Western and Central Pacific Fisheries Commission (WCPFC) to inform its regulation and management of tuna stocks across the region. Moreover, a robust information management infrastructure, initially financed by the high value tuna trade at the GenSan, can serve as a platform for the expansion of the system to support other important fisheries in the Philippines. With the core system in place, the addition of incremental monitoring and data collection for other vessels and stocks such as the sardines, mackerels, and scads, can achieve implementation at lower cost.

IMPACT INVESTMENT THESIS

By combining the two complementary components of a FIMS and fish port investments into a single PPP program, Nexus Blue can generate relatively stable, predictable cash flows to support investor returns, while enabling the management improvements required to improve the long-term health of the fish stocks and landings that drive product throughput, and revenue. In turn, the strategy aims to catalyze better fisheries management in the Philippines and across the region, as the innovative financing structure for a high-quality data management solution offers a replicable model for fisheries management improvements, and economies of scale will drive down adoption costs for subsequent, commercially less valuable fisheries. In addition, the positive network effects of including more vessels and fisheries will increase the quality and value of the system for all users.

To accomplish these objectives, Nexus Blue proposes a PPP with the Philippines government with the following two components:

Step 1: Upon establishing a project company SPV (NexusCo), invest $2.1 million into a subsidiary of NexusCo (referred to hereafter as “FIMSCo”), which will be dedicated to the development and implementation of a comprehensive FIMS. The FIMS will have two interdependent components: (1) At sea, “On-the-Water” IT infrastructure and tools for data collection, monitoring, traceability, and enforcement; and (2) Port-Based IT Infrastructure and tools for catch accounting, market transparency/efficiency, traceability, and enforcement.

Step 2: Simultaneously invest $30.6 million into a second subsidiary of NexusCo, referred to as “PortCo”, which will be responsible for port infrastructure renovations and long-term operations of the General Santos Fish Port Complex. Specifically, this will restore the port to the environmental, safety, sanitation and food safety standards that it was originally designed to meet, increase the efficiency and quality of operations, logistics, post-harvest services (processing and cold storage facilities) and market activities, to the benefit of GenSan’s users. In addition, management and operational efficiencies promise to put GenSan back on a path to financial viability, and establish it as a world-class operation that can serve as a model throughout the region.
By bundling the FIMSCo activities and investments with the PortCo as a port-based PPP, the operator is positioned at a key gateway in the supply chain between the regulators and the regulated as a neutral intermediary. The complementary nature of hard infrastructure and fisheries IT investments will address the needs of the Philippines Amended Fisheries Law, while simultaneously: (1) shifting the financial compliance burden of VMS requirements from fishers; (2) adding value to industry by improving and maintaining high-quality industry operations and supply chain efficiency; and (3) promoting the rapid deployment of EM/ER technology to capture the data needed by regulators for monitoring, control and surveillance (MCS) and fisheries science. The combination of technology deployment and value-added improvements at GenSan will in turn build support for, or at least acceptance of activities required under the Amended Fisheries Law on the part of industry, which to date has represented a key barrier to reform.

**TARGETED SOCIAL AND ENVIRONMENTAL IMPACTS**

The table below sets forth selected impact targets for the Nexus Blue Strategy:

**Fisheries Management Improvement Outcomes and Impacts**

- Provide monitoring and data collection for 429 vessels in the tuna fleet, covering 100% of General Santos based vessels of greater than 3 gt, and covering approximately 60% of tuna landings in the Philippine tuna fisheries.
- Reduce time of data transmission from onboard observers and vessel logs to the BFAR and WCPFC within minutes and hours as opposed to several months to up to a year currently.
- Improve catch accounting coverage from the current 10% to over 70%, and increase the quality of data provided.
- Achieve electronic monitoring and reporting coverage on 7.5% of vessels registered in the WCPFC, representing ~5.0% of tuna landings and ~12.5% of total tuna product throughput in the WCPFC (including frozen imports delivered to GenSan).
- By covering upfront software development and testing costs, catalyze the expansion of the FIMS framework to other commercially important stocks such as sardines, as costs will continue to fall system achieves larger scale.
- Provide the data required for development and ongoing evaluation of science based catch limits.

**Support Fisher Livelihoods**

- Improve fisher productivity by saving an average of 2.5 to 4 days of labor annually per vessel due to easier data entry, representing between 1,100 and 1,700 days saved per year among GenSan vessels.
- Achieve higher value for product through traceability and improved market access.
- Improved crew welfare by enabling email communication and internet access while at sea for months at a time.
- Improved enforcement of slave fishing and child labor practices.
- Protect small-scale, nearshore community fisheries by encroachment and poaching by illegal vessels.
STEP 1: THE FISHERY INFORMATION MANAGEMENT SYSTEM (FIMS)

We first engaged with subject matter experts to research international best-practices in fisheries information technology, regional and international standards on IUU, VMS, traceability and catch reporting, state-of-the-art technologies and trends, and recommendations made in the European Commission’s yellow card report. Based on these findings, we analyzed various combinations of data management interventions across a range of scale and scope in order to (at a minimum) achieve compliance with the EU requirements to avoid trade sanctions and the Amended Fisheries Law, while also weighing the costs and benefits of even more robust, comprehensive and technologically advanced options.

We finally compared these possible combinations of features to NexusCo’s financial model and revenue streams to select the strongest possible financially viable option for a Fishery Information Management System (FIMS) for the GenSan tuna fisheries.

The selected FIMS model includes both a vessel-based and portside component to deploy electronic monitoring and reporting technology (e.g., VMS and e-logs) on 429 vessels and creates a data management center located at GenSan, with increased dockside monitoring, e-reporting and data management at the port. Figure 22 outlines the core technical sub-components of the NexusBlue FIMS PPP Component.

FIGURE 22: Components of a comprehensive FIMS PPP component under the Nexus Blue strategy

<table>
<thead>
<tr>
<th>Vessel-Based FIMS Components</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electronic logbooks (e-logs) for Vessel Operators:</strong></td>
<td></td>
</tr>
<tr>
<td>• Provides electronic reporting (ER) of harvest, fishing effort and bycatch data.</td>
<td></td>
</tr>
<tr>
<td>• Replaces the current paper-based logs found on most of the Philippines fishing fleet, using either a laptop or tablet computer installed in the wheelhouse of the vessel.</td>
<td></td>
</tr>
<tr>
<td>• Passes data to a centralized on-shore data management system via the satellite link used by the VMS system.</td>
<td></td>
</tr>
<tr>
<td>• A variety of systems are commercially available and many can be customized to the needs of the fishery.</td>
<td></td>
</tr>
<tr>
<td><strong>Vessel monitoring system (VMS):</strong></td>
<td></td>
</tr>
<tr>
<td>• Provides electronic monitoring (EM) of the vessel’s position to support MCS activities.</td>
<td></td>
</tr>
<tr>
<td>• Passes data to a centralized on-shore data management system via a satellite link on which other data (including e-log and crew welfare data) may piggyback.</td>
<td></td>
</tr>
<tr>
<td>• A variety of systems are commercially available and many can be customized to the needs of the fishery—a variety of sensors may be deployed that link to the VMS to capture (and transmit) a wide range of data including:</td>
<td></td>
</tr>
<tr>
<td>• Vessel position (GPS data)</td>
<td>Hold temperature</td>
</tr>
<tr>
<td>• Net deployment</td>
<td>Flow scale data</td>
</tr>
<tr>
<td>• Fishing activity</td>
<td>Engine/speed data</td>
</tr>
<tr>
<td><strong>Electronic logbooks for fish observers:</strong></td>
<td></td>
</tr>
<tr>
<td>• Provides ER of observer logs.</td>
<td></td>
</tr>
<tr>
<td>• Replaces the current paper based logs currently used by the Fish Observer Program.</td>
<td></td>
</tr>
<tr>
<td>• Tablet computer to allow real time data capture.</td>
<td></td>
</tr>
<tr>
<td>• Passes data to a centralized on-shore data management system via the satellite link used by the VMS system.</td>
<td></td>
</tr>
<tr>
<td>• A variety of systems are commercially available, and many can be customized to the needs of the fishery.</td>
<td></td>
</tr>
<tr>
<td><strong>Real time communications with central data management center:</strong></td>
<td></td>
</tr>
<tr>
<td>• Links the vessel data to the on-shore, centralized data management system.</td>
<td></td>
</tr>
<tr>
<td>• Satellite is preferred because it ensures full coverage, irrespective of the vessel’s distance from shore.</td>
<td></td>
</tr>
<tr>
<td>• Port operator maintains the bulk contract with the satellite provider to achieve economies of scale and reduce costs.</td>
<td></td>
</tr>
</tbody>
</table>

56 This is the total number of vessels for which VMS is required (over 3 gt in size) that currently do not have systems installed.
**Port-Based FIMS Components**

| Installation of central data management system: | • A data center located at the port (or possibly off-site) including a server, data terminals, software and internet connection.  
• A cloud database to back up the data center and support integration with government third-party databases, as well as public access.  
• Receives real-time data directly from vessels and other data capture technologies deployed.  
• We would use existing technology, and the data center can be constructed using off-the-shelf components. |
| --- | --- |
| Real time communications w/ vessels and fishery managers: | • Data center receives and stores all transmitted data from vessel e-logs and VMS.  
• Each vessel has unique identification number that stays with all records managed in the system. |
| Full time data managers: | • Full-time port staff in charge of ensuring that data from vessels and port activities is received and input into the system.  
• Oversee the various monitoring and auditing activities to ensure data integrity.  
• Report results to fishery managers in Manila.  
• Oversee team of enumerators and monitors (including video catch data auditors) to increase the polling of catch. |
| Port-based enumerators, video auditors, and e-catch accounting tools: | • A cadre of full-time enumerators poll landings to provide landing data that is used to verify vessel e-logs.  
• Independent subset of enumerators are charged with auditing and monitoring video recordings of catch offloadings from vessels  
• In place of the current paper-based system, enumerators use tablets (in waterproof casing) to gather data, which is transmitted via wi-fi to the data center as landings are polled. |
| Connectivity to key gov’t databases: | • Data center feeds information to relevant government databases in real-time.  
• VMS position data is provided to BFAR, MARINA and the Coast Guard in real-time to support MCS activities.  
• Data should be encrypted, and the system designed to protect commercially sensitive information.  
• Data management standards (e.g. data fields and reporting standards). Must be tailored to feed into the recipient database. |
| Connectivity to RFMOs: | • Data center feeds information to relevant RFMO databases in real time.  
• Data should be encrypted, and the system designed to protect commercially sensitive information.  
• Data management standards (e.g. data fields and reporting standards). Must be tailored to feed into the recipient database. |
| Public access of non-confidential fisheries data: | • Data center feeds non-confidential information to a publicly accessible database maintained by the port operator or a third party.  
• Data should be encrypted, and the system designed to protect commercially sensitive information. |
This solution offers standalone eLog electronic reporting (ER) software deployed using various devices onboard vessels to collect required fisheries data. Unlike a web-based solution, standalone software does not require the user to be online to use the system, which is a major advantage of this technology. However, the device will transmit data in real-time while at sea when the device is connected to the internet via a satellite link or GSM Network.

The eLog application allows users to enter data through a device interface, and to generate reports for submission. The software is customizable to meet the requirements of the FMC for a particular fishery: for example, the FMC can specify the fields that are mandatory, if any fields are optional, the transmission system(s) to be used, the data format, and so on. Reports generated by eLogs can include vessel-tracking data that specifies the location and time/date stamps of the fishing activities. Tracking data is collected through the existing mandatory VMS equipment installed onboard or alternatively from a standalone GPS capable device.

This option can replace or complement existing catch and effort reporting paper forms in digital format, saving a significant amount of time for users and fisheries managers, and ensuring timely sharing of data with relevant authorities. Studies of eLog solutions in the Hawaiian longline fleet have shown that eLog reporting can save up to 4 days per year in labor per vessel. In addition, studies have shown that paper-based data from vessel logs, onboard observers, and catch enumerators must be re-entered up to four different times before it is received by BFAR, and the process can take from several months to a year. This places a significant limit on the ability of fishery managers to actively manage the resource, and in many cases the data is so degraded that it is not useful. Figures 23 and 24 provide a visual representation of how vessel-based monitoring and reporting links to port-based data management.

**FIGURE 23: Vessel-Based Electronic Monitoring (VMS) and Electronic Reporting (eLog)**
The FIMS budget is characterized by one-time capital investment in software development, development of a port-based data center, catch accounting tablets and other hardware, and vessel-based eLog and VMS hardware deployed on 429 vessels (Figure 25).

Operating expenses include 8 full-time enumerators hired to exclusively cover GenSan, as well as staff to train and oversee the deployment of technologies, two full-time data managers, operating overhead, and maintenance of hardware and software components. The largest contributor to operating expenses, however, is the annual satellite data subscription per vessel and software licenses, which together comprise 84% of total operating costs. Projected operating costs remain relatively constant over the life of the project, increasing with inflation over time (Figures 26 and 27).
FIGURE 25: FIMS Capex Budget by Category

![FIMS Capital Expenditure by Category]

Total FIMS Capex: $2,068,050

FIGURE 26: FIMS Total Operating Expense Contribution Over the Project Life

![FIMS Year 1 Operating Expenses by Category]

Year 1 FIMS Opex: $596,623
STEP 2: PORT REFURBISHMENT AND OPERATIONS

The port component of the combined PPP provides a physical hub, around which the FIMS infrastructure can be deployed and managed. Because it serves as a natural gateway in the supply chain, the port represents a nexus for sustainable change that is literally embedded in a critical point in the infrastructure through which all products must pass. It therefore offers a platform to the fishing companies and fishers whose cooperation is needed to successfully deploy a data-based sustainability project. The port can provide a variety of services for fishers to garner such cooperation, including:

- Dissemination of information
- Access to social services
- Bearing the cost of VMS systems required by the Amended Fisheries Law
- Provision of more ice than is currently available (possibly even at lower prices)
- Better handling of fish to improve quality at time of sale and thus better pricing for the fishers
- Assistance in marketing GenSan branded fish to international markets, aimed at increasing the value of the catch

By structuring the Nexus Blue Strategy as a port-based PPP, actions needed for a transition to sustainability can be shifted from fishers—who may lack the resources and motivation to bear such obligations—onto port operators as “output specifications” required under the concession.

The port operation would assume the following obligations aimed to support the conservation goals of Nexus Blue:

- Educate fishers on the importance of data collection and management for achieving sustainable fish populations
- Finance, deploy, and maintain the FIMS technology on vessels and at the port
- Finance, install, and maintain a centralized data management system to handle all data recorded from the FIMS PPP Component, preserving commercially sensitive (confidential) data
- Give fishery managers (especially BFAR) accurate, timely, and verifiable data upon which to make better policy decisions
- Improve handling conditions on landing to reduce post-harvest loss and improve quality at time of sale—thus giving back to fishers more value for the same amount of catch
- Provide better cold storage at the port so that vessels with poorer handling conditions do not need to hold fish offshore awaiting better pricing (which is a contributor to post-harvest loss)
- Provide better information on market conditions and create a more transparent pricing system
- To engage them in the process of protecting their own fishing grounds, give feedback to fishers in the form of data and analysis of the information obtained through the FIMS PPP component

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FIGURE 27: Capital Expenditures and Operating Expenses Over the Project’s 35-Year Life

<table>
<thead>
<tr>
<th>YEAR</th>
<th>FIMS Capital Expenditures (USD thousands)</th>
<th>FIMS Operating Expenses (USD thousands)</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>2,500</td>
<td>500</td>
</tr>
<tr>
<td>03</td>
<td>2,000</td>
<td>1,000</td>
</tr>
<tr>
<td>05</td>
<td>1,500</td>
<td>1,500</td>
</tr>
<tr>
<td>07</td>
<td>1,000</td>
<td>2,000</td>
</tr>
<tr>
<td>09</td>
<td>500</td>
<td>2,500</td>
</tr>
</tbody>
</table>

The FIMS BUDGET OVER PROJECT LIFE chart illustrates the capital and operating expenditures over the project’s 35-year life.
## FISHERIES PORT PPP FEATURES

**FIGURE 28:** Key Features of the Fishing Port Infrastructure Components of the PPP

| Project structure: | • Design and construction of new facilities  
| | • Upgrade existing facilities  
| | • Operation and maintenance of fishing port  
| | • Existing staff automatically transfer into PPP  
| | • Implementing Agency: Department of Transportation and Communications (DOTC)  
| | • Management Agency: Philippine Fisheries Development Authority (PFDA)  
| | • 33-year investment term (3-year construction period; 30-year operating concession)  
| | • The Port PPP will likely be implemented via a build-operate-transfer (BOT), a build-transfer-operate (BTO), or a develop-operate-transfer (DOT) contract  
| | • Contractual structure can be flexible depending on the needs of the program and linkage to future projects  
| Development areas: | • Landing  
| | • Storage  
| | • Marketing  
| | • Maintenance  
| | • Infrastructure  
| | • Distributed power generation  
| Methodology: | • Meet Philippines Fishing Port Design and Operation standards  
| | • Meet appropriate International Design and Operation standards  
| | • Use a methodology appropriate to the Philippines and easily replicable  
| Role of private sector: | • Design, build, finance, operate, and maintain the fishing port  
| | • Operator directly hires existing staff located at the port and recruits any additional staff for the duration of the PPP  
| Innovations: | • Solar power as an alternative energy source for the port  
| | • Modular freezing facilities  
| | • Upgrading facilities to internationally-recognized design standards  
| | • State-of-the-art catch accounting technologies deployed on all vessels and throughout port operations  
| Expansion, replicability, scale: | • The Nexus Blue Strategy is based on GenSan, but is not necessarily location or project specific; GenSan would serve as a template to allow replication in other ports both regionally and globally  
| Revenue source: | • Mainly from the operations revenue stream of the port  
| | • Alternative sources of funds (including grants, PRIs and guarantees) should be considered in case of the need for a minimum revenue guarantee or viability gap funding  
| Areas for further study and refinement: | • Full technical feasibility study is needed  
| | • A bottom up analysis of demand, cost, and revenue is needed  
| | • Interest level of BFAR, PFDA, potential partners, and the broader market must be assessed  

GENERAL SANTOS PORT INFRASTRUCTURE AND OPERATIONS BUDGET

The PortCo budget includes an initial capital investment in cold storage and processing facilities, wastewater treatment, administrative infrastructure, general port repairs and upgrades, and 2.4 MW in installed solar power generating capacity (Figure 29). This initial capex would be phased in during a development period of three years, with 33.3% of capex allocated in each year. Operations expenses are comprised of maintenance of port facilities, labor, supplies and equipment, and solar power operations.

FIGURE 29: Port Infrastructure Capital Expenditures

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>ESTIMATED COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Replace and increase number of cold storage facilities</td>
<td>$23,498,627</td>
</tr>
<tr>
<td>Replace main office building, port manager and staff house</td>
<td>223,160</td>
</tr>
<tr>
<td>Replace waste water treatment plants</td>
<td>2,613,831</td>
</tr>
<tr>
<td>Replace and / or repair existing port infrastructure</td>
<td>1,019,667</td>
</tr>
<tr>
<td>Installation of solar panels (2.4 MW capacity)</td>
<td>3,249,678</td>
</tr>
</tbody>
</table>

Total Port Infrastructure CapEx $30,604,963

FIGURE 30: PortCo Capital Expenditures and Operating Expenses Over Project Life

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57 Cost estimates were provided by DCCD, a local engineering firm.
58 These items include access roads, water supply distribution system, waste water and sewage, fire protection system, drainage, power and security system.
THE NEXUS BLUE STRATEGY FINANCIAL ASSUMPTIONS AND DRIVERS

NexusCo’s operating expenses are generated through its two primary investments into data management, through its FIMSCo subsidiary, and port operations at the General Santos Fish Port Complex through the PortCo subsidiary, over an assumed 33-year project life. Because governments generally require PPP revenue projections to be based on predictable, proven, relatively low-risk sources of revenue that can be built into a concession or partnership agreement, the only revenue source considered in the present analysis is derived from established port revenue streams.

REVENUES
Revenues fall into the following categories:

Port usage fee revenue: The primary source of revenue from port user fees; fee streams include the current port user fee revenue across a number of categories such as royalties, wharfage, market operations, brokerage, ice sales, unloading, and other facilities. This is currently the primary source of revenue for GenSan, and will remain so under the assumed base case. However, this will also include the effects of tariff rebasing to compensate for the failure to account for inflation in pricing since the port was opened, as well as improvements to facilities justifying fee increases over time.

Base rental revenue (market, agri-industrial /commercial and cold-storage): These are the revenues currently being generated from the leasing of existing processing, cold storage, agri-industrial and market facilities. Under the base case, we assume an increase of 10% per year beginning in Year 4, after port infrastructure upgrades are completed and operations improved. This will continue to increase at 10% per year through Year 8 as a catch-up for the failure to index costs to inflation since the port was opened in 1998. This also assumes increased occupancy of the existing agri-industrial land to 90% of the available area and improved collection of lease revenues achieved through improved administrative and managerial operations.

Increased throughput: Under the current system, there is likely significant underreporting of product throughput at GenSan, which depresses revenues to the port operators. With the investment in improved data capture and electronic reporting, this should improve significantly. In addition, we estimate that over the long run, FIMS will allow fish stocks to replenish through improved management interventions. While this analysis would need to be expanded as part of a full technical feasibility study, we have assumed here that these drivers would result in a 10% increase in reported landings compared with 2014. This category accounts for the incremental revenue generated by this increased product throughput.

Solar revenues: Revenues generated from the sale of power to the local utility from 2.4 MW installed solar panel capacity, assuming a capacity factor of 17% and a feed in tariff of $0.19 per kWh.

On the following page, Figure 31 highlights the revenues generated over the 33-year life of the project, broken down by category.
OPERATING EXPENSES

Operating expenses from both the PortCo and FIMSCo subsidiaries include:

**Equipment maintenance costs:** Assumed flat rate of 2.0% per annum on capex associated with machinery and equipment, principally cold storage and processing facilities, with inflation applied. The mechanical works are assumed to be approximately 48.0% of the total port upgrade capex. This 2.0% is a common rule-of-thumb applied to major infrastructure maintenance before detailed technical feasibility studies can be undertaken.

**Fixed infrastructure and buildings maintenance:** Based on a rule-of-thumb for so-called civil maintenance of 0.8% per annum of the civil works component of the port upgrade capex with inflation applied. The civil works are assumed to be 52.4% of the port upgrade capex, and include all fixed infrastructure such as buildings, market halls, landing facilities and other fixtures.

**Labor, supplies and materials costs:** 0.8% per annum of the current personnel costs ($835,200 in 2014) with Inflation applied.

**Solar operating costs:** Based on a standard rule of thumb of 2.0% per annum of solar capex with inflation applied.

**Fisheries Information Management System:** Assumed to be 1.0% per annum of FIMS capex with inflation applied, based on interviews with subject matter experts.

Figure 32 highlights the operating expenses generated over the 33-year life of the full project.
The previous assumptions yield the following profile of operating revenue and expenditures over the life of the project (Figure 33).

**BALANCE SHEET ASSUMPTIONS**

This project entails an upgrade of an existing port and includes the transfer of the existing port operations, assets, and liabilities to the concessionaire. However, a major constraint at this point in the analysis is that we have not been able to receive the full, updated financial reporting from existing operations, including a balance sheet from the PFDA, which currently operates GenSan. Due to this, we made a number of assumptions on the opening balance sheet. GenSan was upgraded in 2007, financed by a $26.0 million loan from the Chinese government, for which debt service is forthcoming. This loan will be assumed by NexusCo and serviced from project cash flows. No other existing loan obligations are assumed in the model. As the $26.0 million loan is the only indication of the value of existing assets we have on this port, we assumed a balance sheet with operating assets of $26.0 million.
THE NEXUS BLUE TRANSACTION STRUCTURE

SOURCES AND USES OF FUNDS
The sources of funds for the Nexus Blue PPP investment under the base case include an assumed government subsidy of $5.9 million, in order to achieve the 15.0% blended IRR hurdle required by the Philippines government for a PPP of this nature (Refer to Annex B for more detail on the Philippines PPP legislation and process). The base case assumes $12.9 million in senior, non-recourse debt, denominated in the local currency, likely from a commercial bank. For PPPs with non-recourse project debt, the project sponsor generally contributes subordinated junior debt and/or hybrid equity (such as preferred shares). This is assumed to be $7.1 million under the base case, with sponsors financing an additional $1.8 million in common equity. Finally, excess cash generated from GenSan’s ongoing operations during the construction period is assumed to fund the remaining $6.4 million under the base case. The uses of funds under the base case assume $700,000 in transaction costs and financing fees, $650,000 of interest during construction, $2.1 million in FIMS capex, $27.4 million in infrastructure upgrades to the existing port and $3.2 million to fund the installation of 2.4 MW of solar power generation capacity. The sources and uses of funds are outlined in Figure 34.

FIGURE 34: Sources and Uses of Funds

<table>
<thead>
<tr>
<th>SOURCES OF INVESTMENT PROCEEDS</th>
<th>USD $</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior Project Debt</td>
<td>$12,878,545</td>
<td>37.8%</td>
</tr>
<tr>
<td>Junior Debt (Sponsor)</td>
<td>7,076,205</td>
<td>20.8%</td>
</tr>
<tr>
<td>Common Equity (Sponsor)</td>
<td>1,769,051</td>
<td>5.2%</td>
</tr>
<tr>
<td>Government Subsidy</td>
<td>5,871,899</td>
<td>17.3%</td>
</tr>
<tr>
<td>Excess Cash from Operations</td>
<td>6,438,185</td>
<td>18.9%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$34,033,885</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>USES OF INVESTMENT PROCEEDS</th>
<th>USD $</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transaction Costs &amp; Fees</td>
<td>$712,207</td>
<td>2.1%</td>
</tr>
<tr>
<td>Interest During Construction</td>
<td>$648,666</td>
<td>1.9%</td>
</tr>
<tr>
<td>FIMS Capex</td>
<td>2,068,050</td>
<td>6.1%</td>
</tr>
<tr>
<td>Port Infrastructure Upgrades</td>
<td>27,355,284</td>
<td>80.4%</td>
</tr>
<tr>
<td>2.4 MW Solar Generation Capacity</td>
<td>3,249,678</td>
<td>9.5%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$34,033,885</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>
STRUCTURE AND GOVERNANCE

The Nexus Blue transaction structure follows an established PPP project finance arrangement, in which an SPV (NexusCo) is created as the project company, funded by equity investment and junior debt by the project sponsor. The sponsor is generally a consortium of investors and project developers. The government grants a concession to NexusCo to refurbish, build, operate and maintain the IT and port infrastructure in exchange for revenues in the form of fees, rentals, and services provided by the facility. In the case of a joint-venture-type PPP, the government will commit equity and share in the project cash flows, and ownership will transfer back to the public sector at the end of the 30-year operating concession. NexusCo issues non-recourse project debt secured by the predictability and stability of long-term cash flows under the concession. The indicative transaction structure also assumes a loan guaranty provided by either a development finance institution (DFI) or the Philippine government. The NexusCo project company has two subsidiaries under the envisioned structure, PortCo and FIMSCo, to allow for the possibility of attracting grant capital or subsidies for the FIMS portion of the investment, as this does not generate revenue under the base-case model (Figure 35).

FIGURE 35: Nexus Blue Public-Private Partnership Transaction Structure

- Impact Investors
- Local Project Developers
- Int’l Project Developers
- Common Dividends
- Preferred Dividends
- Junior Debt Service
- NexusCo
- Common Equity
- Hybrid Equity
- Mezzanine Debt
- FIMSCo (Data Management)
- PortCo (Infrastructure & Operations)
- Senior Project Debt
- Senior Debt Service
- FMS Data Management
- Port Infrastructure & Operations
- Landing Infrastructure
- Environmental & Sanitation
- Vessel Unloading
- Cargo Unloading
- Waste Recycling
- Sewage Treatment
- Data Collection
- Traceability
- Chain of Custody
- Implementation
- Outsource and Manage implementation
- Catch Accounting Database
- Monitoring & Compliance
- VMS
- CDS
- Market Operations
- User Fee & Rental Revenue
- Guarantee Fee
- Project Debt Guaranty
- 30-year operating concession Equity
- Equity (JV only)
- Sharing of revenue or cash flow
- Asset Ownership at End of Concession Term
- Implementation Agency
- Ministry of Finance
- NEDA
- DFIs
- National Government
- Investment to Build, Operate & Maintain Facilities
- Financial Institutions
- DFI
- Senior Debt
- Common Equity
- Hybrid Equity
- Mezzanine Debt
- Equity
- (JV only)
- 30-year operating concession Equity
- Equity (JV only)
ANALYSIS OF FINANCIAL RETURNS

To evaluate the project financial returns and viability as a PPP in the Philippines, we calculated the following return metrics:

Project Internal Rate of Return (Unlevered IRR): Project IRR on the basis of the total free cash flow, including returns to all capital providers including debt and equity.

Sponsor IRR (Blended IRR): The sponsor IRR of a SPV under a PPP structure considers that the sponsors are generally expected to commit junior or mezzanine debt to the capital structure in addition to their equity investment. The blended IRR accounts for the multiple types of securities that project sponsors invest into an SPV such as NexusCo, and the interest, repayment and dividends received by sponsors after repayment of senior commercial bank debt service.

Viability Gap Funding (VGF): A subsidy provided by the government to support infrastructure projects that are economically justified from a societal perspective, but fall short of the target sponsor blended IRR established by the government. In our model, the VGF is calculated as the capex subsidy that is required to yield a target sponsor IRR of 15.0%, which is the minimum threshold that the Philippines government generally requires before it will submit a project for public bidding (Refer to Annex B for more detail on the Philippines PPP legislation and process).
SUMMARY OF RETURNS
As indicated in Figure 36, the project currently yields a 12.4% blended return to sponsors, which falls below the unofficial government return hurdle of 15%. This means that under the current assumptions, the project will need to be structured with viability gap funding (VGF) from the government partner. This is an established structure used by many socially beneficial PPPs, but requires a social cost-benefit justification. A calculation of the required VGF indicates that a subsidy of $5.9 million would be required to close the gap to the 15.0% return hurdle. Therefore, PPP or JV structures that allow a VGF subsidy must be considered in order to ensure that the project is bankable. However, it is important to note that the assumptions made for the purposes of this analysis were quite conservative due to the high-level nature of the pre-feasibility study. We believe that a detailed technical feasibility study would likely indicate a more attractive return profile and achieve the 15.0% threshold without requiring a government subsidy or other VGF funding.

FIGURE 36: Summary of Returns

SUMMARY OF BASE CASE FINANCIAL RETURNS

<table>
<thead>
<tr>
<th>Description</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sponsor blended IRR (excluding gov’t subsidy)</td>
<td>12.4%</td>
</tr>
<tr>
<td>Sponsor blended IRR (including gov’t subsidy)</td>
<td>15.0%</td>
</tr>
<tr>
<td>Project unlevered after-tax IRR</td>
<td>15.1%</td>
</tr>
<tr>
<td>Required government subsidy to arrive at 15% sponsor IRR</td>
<td>$5.9m</td>
</tr>
</tbody>
</table>
SENSITIVITY ANALYSIS

The effects of several key inputs on the financial return of the project have been forecasted here in various sensitivity scenarios. Each illustrative scenario is generated by flexing one of the following key variables:

**Revenues:** The revenues of the project are generated in part based on contributions from equipment and facility rental, port user fees, unloading fees, and a range of other income generating activities for the port. If these revenues fluctuate from forecasted levels, there is a possibly significant effect on IRR and required subsidy. With base case revenue assumptions, sponsor IRR is 12.4%, with a required subsidy of $5.9 million to achieve the 15.0% blended IRR hurdle. In the downside case, we assume a revenue haircut of -20.0% over the life of the project, and in this scenario the blended IRR falls to 8.2%, with a required government subsidy of $15.8 million to achieve a 15.0% blended IRR. In the upside case, we assume that revenue is increased by 20.0%, and in this scenario, IRR is forecasted at 16.6% with an implied “subsidy” of -$3.9 million required to achieve a 15.0% blended IRR.

**Capital Expenditures:** Capital expenditures in the strategy consist of facility restoration and construction, and solar panel installation. Costs of these expenditures may vary, and their increase or decrease affects the project’s IRR. Downside case capital expenditures are 20% higher than in the base case, and result in a 10.3% blended IRR, which translates to a required subsidy of $12.0 million to meet the 15.0% threshold. Expenditures are assumed to be 20% lower in the upside case, which increases the blended IRR to 15.1%, which implies a “subsidy” of -$0.2 million at the 15.0% blended IRR equivalent.

**Operating Expenses:** Operating expenses of PortCo and FIMScO represent the ongoing costs of the project, including equipment maintenance, labor, and ongoing FIMS costs. These costs have a small but meaningful effect on IRR, and based on an downside assumption of 20% higher costs, blended IRR falls to 11.1%, with a required subsidy of $8.5 million to achieve the 15.0% blended IRR hurdle. In the upside case, costs are scaled down by 20%, which drives the blended IRR up to 13.6%, requiring a subsidy of $3.3 million.

| BASE CASE BLENDED IRR (excl. subsidy) | 12.4% |
| BASE CASE GOV’T SUBSIDY TO ACHIEVE 15% TARGET IRR (millions) | $5.9 |

### SENSITIVITY ANALYSIS

<table>
<thead>
<tr>
<th>SCENARIOS</th>
<th>BLENDED IRR (%)</th>
<th>BLENDED IRR IMPACT (percentage point ∆)</th>
<th>GOV’T SUBSIDY @ 15% IRR (millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
<td>Downside</td>
<td>Upside</td>
<td>Downside</td>
</tr>
<tr>
<td>Revenue Variance</td>
<td>-20.0%</td>
<td>20.0%</td>
<td>8.2%</td>
</tr>
<tr>
<td>Senior Debt Coupon</td>
<td>6.1%</td>
<td>7.3%</td>
<td>4.9%</td>
</tr>
<tr>
<td>CAPEX Variance</td>
<td>-20.0%</td>
<td>-20.0%</td>
<td>10.3%</td>
</tr>
<tr>
<td>OPEX Variance</td>
<td>-20.0%</td>
<td>11.1%</td>
<td>13.6%</td>
</tr>
</tbody>
</table>

Present value of subsidy payments made during the development period
This section presents several of the leading risk elements that will potentially affect the development and implementation of the Nexus Blue Strategy. A robust risk identification and analysis is itself a critical part of the Philippines PPP implementation process. However, the risk factors included here are presented for the purpose of shaping and structuring the project to ensure that a wide spectrum of risk is considered from the outset.

Project development risk refers to the risk during the early stages of development that a viable PPP does not emerge from this study. These risks are generally of a third-party nature, and the key mitigation efforts should be focused on stronger stakeholder engagement, as shown below.

### NEXUS BLUE RISKS AND MITIGANTS

<table>
<thead>
<tr>
<th>RISK</th>
<th>DESCRIPTION</th>
<th>MITIGANTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of BFAR buy-in</td>
<td>BFAR may have another strategy or be supporting another approach to MCS that is incompatible with the Nexus Blue strategy.</td>
<td>Nexus Blue will launch an engagement plan in the early stages of the project. Also, preparations will be made to demonstrate the value of letting the PPP cover the cost of MCS at GenSan on a pilot basis for a greater MCS scheme, where the FIMS PPP seeks to pay for itself.</td>
</tr>
<tr>
<td>Lack of PFDA buy-in</td>
<td>PFDA may resist privatizing port operations and may not wish to relinquish control.</td>
<td>Nexus Blue will launch an engagement plan in the early stages of the project and will consider a joint venture approach to engage PFDA as an ongoing participant in the port operations.</td>
</tr>
<tr>
<td>Resistance from fishers</td>
<td>Fear of monitoring and surveillance may lead to resistance to participating in FIMS PPP scheme.</td>
<td>Nexus Blue will seek to engage fishers early with a campaign showing how FIMS PPP takes the direct financial burden of compliance with the Amended Fisheries Act off their shoulders. A parallel campaign can engage fishers in the conservation of fish stock (i.e., owning their waters).</td>
</tr>
<tr>
<td>Failure to find funding for feasibility study costs</td>
<td>Delay in commencing feasibility study to the point where the project is rendered irrelevant.</td>
<td>There are possible structures to incentivize a private sector developer to join the project earlier during the feasibility study phase, rather than wait for this project to be bid out. A funder and stakeholder engagement plan in the months following this study is also possible.</td>
</tr>
<tr>
<td>BFAR develops a competing project with another partner</td>
<td>Competing project renders the FIMS PPP Component irrelevant.</td>
<td>Engagement with BFAR immediately. Demonstrating the value of shifting FIMS and MCS costs off fishers or the government budget will also mitigate this risk.</td>
</tr>
<tr>
<td>Decreased port demand</td>
<td>Fewer fishers than expected may use the port, causing it to be financially unviable.</td>
<td>The project can be structured as a joint venture with government to incentivize support in the case of lower demand.</td>
</tr>
</tbody>
</table>
## KEY OPERATING RISKS

<table>
<thead>
<tr>
<th>RISK</th>
<th>DESCRIPTION</th>
<th>MITIGANTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decreased landings or leakage to other landing centers</td>
<td>Fewer fishers participating in the EM/ER project, resulting in lower landing volumes – risk to cost recovery if performance-based charge system is adopted.</td>
<td>In addition to the above, multiple cost recovery schemes are possible and would prevent the success of the project being overly reliant on catch volume.</td>
</tr>
<tr>
<td>Technology or data standards rendered irrelevant or obsolete by action of government</td>
<td>After the project commences, government may release new MCS technology requirements or data reporting standards that do not match PPP technology choices.</td>
<td>Appropriate engagement with BFAR and WCPFC would enable setting the standards needed for Philippines MCS and reporting to RFMOs for foreseeable future. A concession contract with government would identify a change in technology or reporting standards as a change in law, leading to a compensation event.</td>
</tr>
<tr>
<td>Technology choice does not hold up under actual fishing conditions</td>
<td>Technology needs replacement due to failures.</td>
<td>The technology choice will be made on the basis of proven technologies.</td>
</tr>
<tr>
<td>Fishers tamper with instruments and input false data</td>
<td>Fishers may be tempted to turn off recording equipment, tamper with instruments, or input false data.</td>
<td>Experience in other global fisheries indicates that tampering and false data input can be reduced through proper technology selection and auditing procedures. The technology choice will be made on the basis of tamper-resistant technology (including rare event alerts).</td>
</tr>
<tr>
<td>Portside enumerators face threats/resistance</td>
<td>Enumerators may be unable to gather data freely due to security issues.</td>
<td>Deployment of full-time security at port would mitigate this.</td>
</tr>
<tr>
<td>Vandalism and damage to data center</td>
<td>Break-ins or other vandalism damage to the data center is possible.</td>
<td>Back up all information onto cloud database. In addition, the data center can be made more secure by being intentionally placed in the most secure location in the port and with the deployment of full-time security.</td>
</tr>
</tbody>
</table>

## LEGAL RISK

<table>
<thead>
<tr>
<th>RISK</th>
<th>DESCRIPTION</th>
<th>MITIGANTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inconsistency with new rules on MCS</td>
<td>Contents of forthcoming rules for the Amended Fisheries Act are unknown—it is possible that a specific MCS regime has been mandated and that the technology choice will be predetermined, reducing project flexibility and viability.</td>
<td>It is possible to restructure the project to become compliant. A FIMS PPP restructuring study may be required to reconsider the project structuring options.</td>
</tr>
<tr>
<td>Deployment period for MCS compliance under new regulations set by BFAR does not match project construction schedule</td>
<td>The FIMS PPP component of the proposed strategy cannot meet the government’s need to deploy MCS.</td>
<td>During the feasibility study phase, the project can be sequenced such that the FIMS PPP activities begin deployment earlier while the port is under construction, if necessary. Also, in-depth engagement with BFAR should be undertaken to get immediate buy-in of the FIMS PPP concept that can be used to pilot the MCS deployment.</td>
</tr>
</tbody>
</table>
## APPENDIX

Financial projections and returns analysis for Nexus Blue over the 3-year construction period and the first 10 years of the operating concession period:

### FINANCIAL PROJECTIONS

<table>
<thead>
<tr>
<th>Construction Period</th>
<th>Operational - Under Concession</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>REVENUES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Rental</td>
</tr>
<tr>
<td>$317,745</td>
</tr>
<tr>
<td>$324,438</td>
</tr>
<tr>
<td>$321,813</td>
</tr>
<tr>
<td>$322,508</td>
</tr>
<tr>
<td>$344,644</td>
</tr>
<tr>
<td>$389,551</td>
</tr>
<tr>
<td>$395,060</td>
</tr>
<tr>
<td>$391,240</td>
</tr>
<tr>
<td>$412,207</td>
</tr>
<tr>
<td>$417,435</td>
</tr>
<tr>
<td>$424,984</td>
</tr>
<tr>
<td>$458,097</td>
</tr>
</tbody>
</table>

### OPERATING EXPENSES

| Port Operating Expenses | $306,050 |
| Port Operating Expenses | $306,050 |
| $306,050 |
| $306,050 |

### CASH FLOWS TO SPONSORS W/O SUBSIDY

<table>
<thead>
<tr>
<th>Project Free Cash Flows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Tax Project Free Cash Flow (Undiscounted)</td>
</tr>
<tr>
<td>$(9,077,901)</td>
</tr>
<tr>
<td>$(9,322,635)</td>
</tr>
<tr>
<td>$3,295,122</td>
</tr>
<tr>
<td>$3,619,652</td>
</tr>
<tr>
<td>$4,212,990</td>
</tr>
<tr>
<td>$4,633,103</td>
</tr>
<tr>
<td>$5,244,061</td>
</tr>
<tr>
<td>$6,071,820</td>
</tr>
<tr>
<td>$6,680,583</td>
</tr>
<tr>
<td>$7,090,997</td>
</tr>
<tr>
<td>$9,657,777</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cash Flows to Sponsors w/o Subsidy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blended Cash Flow to Sponsors - w/o Subsidy</td>
</tr>
<tr>
<td>$(9,218,610)</td>
</tr>
<tr>
<td>$(9,717,594)</td>
</tr>
<tr>
<td>$3,295,122</td>
</tr>
<tr>
<td>$3,619,652</td>
</tr>
<tr>
<td>$4,212,990</td>
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<tr>
<td>$5,244,061</td>
</tr>
<tr>
<td>$6,071,820</td>
</tr>
<tr>
<td>$6,680,583</td>
</tr>
<tr>
<td>$7,090,997</td>
</tr>
</tbody>
</table>

### TOTAL PROJECT RETURNS

| Project IRR (Pre-Tax) | 17.3% |
| Project IRR (After-Tax) | 15.1% |

<table>
<thead>
<tr>
<th>SPONSOR RETURNS W/O SUBSIDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sponsor Blended IRR</td>
</tr>
<tr>
<td>Sponsor Equity IRR</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SPONSOR RETURNS W/ SUBSIDY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sponsor Blended IRR</td>
</tr>
<tr>
<td>Sponsor Equity IRR</td>
</tr>
</tbody>
</table>
ANNEX A: THE PUBLIC-PRIVATE PARTNERSHIP FRAMEWORK

The following section provides an overview of public-private partnerships for those without prior knowledge of PPP framework and variations.

**DEFINITION**

While definitions and interpretations of “public-private partnerships” are varied, ranging from corporate social responsibility initiatives to urban renewal projects, we conform here to the definition used by the World Bank. It defines a PPP as “a long-term contract between a private party and a government entity, for providing a public asset or service, in which the private party bears significant risk and management responsibility, and remuneration is linked to performance.”

This definition reflects the investment-driven, return-seeking framework that many national governments have adopted as a means to attract private capital, management skills, innovation, and efficiency in developing, constructing, and operating public infrastructure and services.

**Defining Characteristics of Successful Public-Private Partnerships**

1. Binding legal contract between public and private sector
2. Used for the provision of public infrastructure or services on a project basis over a medium to long-term time frame
3. Private sector partner commits up-front capital investment and assumes associated development, implementation, and operating risks
4. Upon successful service delivery, the private party recovers investment via user fees or contracted government payments at a level specified in the contract
5. Risk and cost are allocated to party best able to manage them
6. Private sector partner is able to deliver greater efficiency and value for the money

**FIGURE 37: The Public-Private Partnership Spectrum**

**PPP REVENUE MODELS**

In exchange for financing, developing, and/or operating a public asset or service on a contracted basis, as well as meeting the performance requirements defined in the contract, the private partner is entitled to compensation through one of two structures (or in some cases a hybrid).

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**AVAILABILITY PAYMENTS**

In an Availability PPP, the public partner pays predetermined, contracted fees, called “availability payments,” to the private partner in exchange for consistently providing the asset or service at the agreed level of quality. As a result, private investors in Availability PPPs bear the performance risk for delivering the products or services at the agreed-upon quality and consistency, but do not typically assume commercial market risk.

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**CONCESSIONS**

Under a Concession PPP, the government grants the private sector the right to build, operate, and charge users of the public infrastructure or service, at a regulated fee, toll, or tariff, under the oversight of regulators and in accordance with the concession agreement itself. Revenues are structured to cover debt service, fixed operating costs, and enable an appropriate return on equity (often capped by the regulators). As there is no guarantee of payment under the concession, these projects assume the risk that the asset or service will be able to attract and maintain users over the life of the project. For this reason, Concession PPPs are often granted for “natural monopolies” such as metro lines, where there are no direct competitors to steal market share.

The form that a particular project PPP takes will largely depend on the type of project, the specific government’s PPP protocols and preferences, the level of project priority, the nature of the project risks, the social benefits of the project, and the manner in which the project was solicited. In some cases, a project may utilize a combination of concession and availability payments.

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**PROJECT DEVELOPMENT**

Because of the high-profile and often politically sensitive nature of PPPs, governments work hard to ensure that projects are extremely well studied and fully vetted before any commitments are made. Public partners and other stakeholders want to make sure that on the one hand, the project does not fail financially, requiring the public sector to bail it out or leave a white elephant behind. On the other hand, government officials want to ensure that returns are not so attractive at the expense of either taxpayers or ratepayers that the arrangement will become politically unpopular. Therefore, the project development cycle is slow, laborious, and costly, often requiring commitments of millions of dollars in high-risk development equity and/or public sector resources before a decision is even made on whether a project can proceed.

Only after the project has been officially awarded and contracts signed is the private sponsor in a position to secure project debt and move ahead with construction and/or implementation. Once the PPP is operational, sponsor risk is dramatically reduced and the equity assumes a profile more akin to fixed income. The entire development process, from concept to operation, spans several years. Figure 38 lays out an indicative project development cycle.

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60 While there are no usage fees in this type of project, an example is the PPP for School Infrastructure Project wherein the private sector is responsible for making available classrooms (consisting of design, financing, construction, and maintenance) for a contract fee with the Department of Education.

61 An example of a Concession PPP is the Ninoy Aquino International Airport (NAIA) Expressway wherein the Department of Public Works and Highways (DPWH) granted the private sector the right to build and operate the expressway. Under the contract, the private sector was given the right to collect a toll (user charge) from the users of the expressway.
PPP PROJECT CHARACTERISTICS

Due to the development cycle, detailed feasibility analysis, government vetting, and associated cost of these activities, PPPs are typically only feasible for large, complex, capital-intensive projects. Under PPP requirements defined by the government facilitating authorities, a mandated minimum investment size generally must be met before the government will even consider the proposal. While it depends on the project context and geography, stakeholders on both the public and the private side will often only take an interest in investments of over $100 million for traditional infrastructure PPPs.

The long asset lives involved, together with the fundamental objective of the PPP construct to provide ongoing public goods and services, means that the contracts involved are usually quite long, often in excess of 20 years. As such, the investments are largely or entirely self-amortizing, and when there is a formal exit by way of a compensated transfer back to the public sector, this does not act as a meaningful driver of the overall return. This also means that PPPs are project investments with a defined project “life” established in the concession or availability contract.

PPP STAKEHOLDERS

There are three categories of stakeholders in a typical PPP: (1) Private Sponsor(s); (2) Government Counterpart(s); and (3) Direct Beneficiaries/ Ratepayers. On the private side, particularly in large, multifaceted complex PPPs, the contracting party is often a consortium of complementary partners, each fulfilling a specific function. These roles include the original project developer(s) who identify the opportunity, undertake initial feasibility work, and assemble the consortium; the project operator(s) and/or asset manager(s) who provide the project implementation and ongoing operating expertise; and the financial sponsor(s) who provide equity and pull together project financing. However, these roles may also be filled by the same party.

On the public side, the main counterpart is often the government agency responsible for the category of goods or service being provided, also known as the implementing agency. For example, in a toll road PPP, the implementing agency may be the Department of Transportation. Also on the public side, there is usually a dedicated PPP unit

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62 Where availability payments or government subsidies are utilized, taxpayers may be considered as a fourth stakeholder category.
responsible for promoting and managing the PPP development process, including procurement, bidding, upholding the country’s PPP laws, and developing and implementing relevant policies. Where government financing is required, the Ministry of Finance or equivalent may also be involved. Other relevant participants include lenders, legal and financial advisors, consultants, designers, and contractors.

**PPP INVESTOR LANDSCAPE**

Private equity investors in PPPs include the early-stage, high-risk development equity provided by the project developer(s), and the lower-risk, later-stage project equity provided to fund the project company and initial capital requirements. This later-stage equity may be provided by the members of the private consortium themselves, or may be contributed by private or institutional real asset equity investors via a dedicated financial sponsor. While the development equity is high-risk venture investment with commensurate returns, the project equity is akin to yield-based investments in other real assets such as timber or Master-Limited Partnerships (MLPs), with predictable, inflation-hedged returns.

Global investor demand for infrastructure and PPP investments has grown in recent years, driven by a hunt for yield during a protracted period of low interest rates, and by increasing comfort with and access to the asset class. Infrastructure funds raised over $31 billion globally in 2014, and $21 billion was raised during the first half of 2015. PPPs have been utilized for projects in defense, environmental protection, government buildings, hospitals, information technology, municipal services, prisons, recreation, schools, solid waste, transport, tourism, and water. To date, no sustainable fisheries-focused public-private partnership has been implemented.
ANNEX B: PUBLIC-PRIVATE PARTNERSHIPS IN THE PHILIPPINES

In cases where the public sector has limited experience, effectiveness, and ability to innovate around the delivery and management of social goods, Public-Private Partnerships provide an opportunity to combine the authority and oversight of the public sector with private sector project development and business acumen. In emerging markets especially, the PPP structure has been widely adopted, as countries struggle to close gaps in infrastructure and services for an increasingly mobile, urbanized population.

The Philippines pioneered the use of public-private partnerships in major government infrastructure projects in Asia and has a strong regulatory framework that facilitates the development and approval of projects. The PPP Build Operate Transfer (BOT) Law, or Republic Act (RA) 6957, passed in 1990, was the first of its kind in the region. Faced with public-sector budget constraints and limited capacity, PPPs have become a critical source of capital and of development and operating expertise for priority projects including electricity, public transportation, water distribution, toll roads, airports, and container ports.

Administered by the National Economic Development Corporation (NEDA), the Philippines BOT law supports national growth and development by engaging the resources and capital of the private sector to achieve the country’s priority development goals. The government may authorize a PPP for any sector, including nontraditional areas such as information technology (IT), housing, tourism, education, and health, as well as traditional sectors such as power plants, highways, ports, water supply, irrigation, reclamation, government buildings, slaughterhouses, warehouses, public markets, solid waste, drainage, and other projects that may be deemed appropriate.

PHILIPPINES PRECEDENT PROJECTS AND TRACK RECORD
Since its implementation in 1990, the Philippine BOT program has generated total private capital investment in PPPs of over $25 billion. During the past 5 years, the government established the approach as a priority pillar of economic growth and infrastructure development. It has awarded 10 projects since 2010, and there are currently 14 others in varying stages of procurement. Over the past year, the government awarded two PPP contracts for transportation projects costing $1.3 billion, approved a railway PPP with an indicative cost of $3.8 billion, rolled out a $1.5 billion port modernization project, and approved a transportation IT project worth $6 million. In recognition of its regional leadership role in PPPs, the Philippines was awarded the U.K.’s award for “Best Central/Regional Government PPP Promoter,” won the IJGlobal award for “Asia-Pacific Grantor of the Year,” and was recognized as the most improved country in the Asia Pacific region for Public-Private Partnership readiness in a 2015 report commissioned by the Asian Development Bank.

PPP ROUTE OPTIONS AND COMPARISONS
Depending on the nature of the project and the entity leading the development of the PPP, there are three core route options that developers and government agencies can follow. The most common path is for governments to initiate projects as a “solicited” PPP, which they first study and approve, and then put through a bidding process for interested private-sector consortia. As projects are put forth by the government, incentives such as guarantees and availability revenues are often available, whereby the government will directly pay the private partner for developing assets and providing services. However, solicited projects are subject to extensive private-sector competition, and development periods can be especially long and unpredictable, often spanning several years.

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64 PPP Talk January–June 2015.
In contrast, the “unsolicited” PPP route allows a private developer to conceive of and develop a specific project proposal based on NEDA’s economic development priorities, which it submits to NEDA for review and consider whether or not to accept. Upon acceptance, the government publicizes the proposal and puts out a limited competitive process in the format of a “Swiss Auction”. This allows other interested developers to put in a bid on the project during a 90-day window, and the competing proposal(s) are then weighed against the original project proponent’s proposal before a decision is made on which group to award the contract to. If no other groups bid during a period of 90 days, the project is automatically awarded to the original proponent.

The unsolicited process is streamlined, allowing the private project developer to more fully control the process and timing and tailor the proposal to their vision and strengths. Though faster and more efficient for the private sector, NEDA is very strict about the requirements for project acceptance, and opportunities for government subsidies and availability payments are very limited. In addition, the project proponent must invest significant capital to develop the project, and there is no guarantee that the proposal will be accepted by NEDA, and competition for the project remains in the form of the abbreviated bidding process.

The newest structure option, established by NEDA in 2013, is the “Joint-Venture” (JV) PPP route, in which a government corporation may enter into either an equity or a contractual joint venture arrangement with the private sector to co-invest in the assets or services provided for public benefit. Unlike the other arrangements, where the government assigns a formal concession and monitors performance but otherwise has no direct participation, the JV route provides for a more fulsome government role.

Figure 39 identifies the main pros, cons, and mitigation steps to each pathway as applied to the project.

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**Figure 39: Pros and Cons of the Three PPP Pathway Options**

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>PROS</th>
<th>CONS</th>
<th>MITIGATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solicited PPP</td>
<td>• Permits Government subsidization and guarantees</td>
<td>• Unpredictable development period</td>
<td>• Garner full government stakeholder buy-in from BFAR, BAS, NEDA, and PFDA to fast track project</td>
</tr>
<tr>
<td></td>
<td>• Payment structure could include availability based payments if budget is available</td>
<td>• Will require significant investment to assist Government to get project on priority list</td>
<td>• Garner government stakeholder support of budget allocation for availability payment</td>
</tr>
<tr>
<td></td>
<td>• Investment incentives may be available</td>
<td>• Availability payment subject to willingness of implementing agency to allocate funds over the long term</td>
<td>• Align best participants and lenders early on to reduce strength of competitors</td>
</tr>
<tr>
<td></td>
<td>• Funds from project development facility may be available for project development costs</td>
<td>• Subject to competition after project is listed</td>
<td>• Hold back a few innovations to surprise evaluators during bidding</td>
</tr>
<tr>
<td>ROUTE</td>
<td>PROS</td>
<td>CONS</td>
<td>MITIGATION</td>
</tr>
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<td>-----------------</td>
<td>----------------------------------------------------------------------</td>
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<td>-----------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Unsolicited PPP</td>
<td>• Private sector may propose</td>
<td>• No government subsidy or guarantee (i.e., no Viability Gap Funding [VGF] support), which could provide a challenge to financing</td>
<td>• Structure project with sufficient revenue to not require subsidy</td>
</tr>
<tr>
<td></td>
<td>• Payment structure could include availability-based payments if budget is available</td>
<td>• No funds from project development facility are available for project development costs</td>
<td>• Garner government stakeholder support of budget allocation for availability payment</td>
</tr>
<tr>
<td></td>
<td>• Process has averaged 14-15 months after approval of project proposal</td>
<td>• Access to investment incentives is ambiguous, a project is not prioritized</td>
<td>• Find aid funding for components of project requiring subsidy or support</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Unpredictable development period</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Will require proponent to bear full project development until tender</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Availability payment subject to willingness of implementing agency to allocate funds over the long term; often difficult to obtain</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Subject to competition in the end</td>
<td></td>
</tr>
<tr>
<td>Joint Venture</td>
<td>• Private sector may propose</td>
<td>• Unpredictable development period</td>
<td>• Garner full government stakeholder buy-in from BFAR, BAS, NEDA, and PFDA to fast track project</td>
</tr>
<tr>
<td></td>
<td>• Possibility for direct negotiation</td>
<td>• Subject to competition in the end</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Subsidy permitted on approval of budget</td>
<td>• No funds from project development facility are available for project development costs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Theoretically shorter development period</td>
<td>• Largely untested and would require significant support of government to progress</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>• May not be fully replicable in other countries where JV-type partnerships are not permitted</td>
<td></td>
</tr>
</tbody>
</table>

ANNEX C: PROPOSED INVESTMENT DESIGN METHODOLOGY FOR FISHERIES PPPS

THE PPP INVESTMENT BLUEPRINT DEVELOPMENT PROCESS
Due to the unique structure and needs of the PPP framework, Encourage Capital undertook a 12-step PPP blueprint development process, split between a five-step project scoping exercise and a seven-step project pre-feasibility study. The full process required engaging in dialogue with a wide range of fisheries stakeholders, advisors, and consultants to develop and evaluate the challenges, opportunities, risks, and legal viability of a fisheries PPP strategy as profiled within the national-scale Investment Blueprint. To identify potential projects and evaluate their viability, Encourage Capital’s 12-step review process sought to determine whether the project attributes conformed with the requirements of local PPP law, including the identification of a financially viable revenue model, while achieving national-scale (as well as regional-scale) management reform objectives with outsized impact.

PROJECT SCOPING EXERCISE
The objective of the project scoping activity was to refine the goals of a potential Sustainable Fisheries Public-Private Partnership and to narrow the project alternatives for further technical evaluation. Scoping activities are summarized in the Figure 40 below:

FIGURE 40: The Five Steps Undertaken During the Project Scoping Exercise

<table>
<thead>
<tr>
<th>OBJECTIVE</th>
<th>ACTIVITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stakeholder Analysis</td>
<td>• Interviews with government officials including DA, BFAR, NEDA, NSAP, LGUs, the PFDA, and others</td>
</tr>
<tr>
<td></td>
<td>• Interview local and international NGO leaders</td>
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<tr>
<td></td>
<td>• Interview industry participants including port personnel, vessel operators and fishers, seafood companies, and others</td>
</tr>
<tr>
<td>Initial Fisheries Assessment</td>
<td>• Develop profile of international, national, and local fisheries laws and requirements</td>
</tr>
<tr>
<td></td>
<td>• Assess current fisheries management systems and processes, particularly focused on stock assessments, data capture, monitoring, and traceability</td>
</tr>
<tr>
<td></td>
<td>• Evaluate candidate fisheries status and condition, with consideration of the fishery size and whether revenues are large enough to could justify costs</td>
</tr>
<tr>
<td>Preliminary Regulatory Analysis</td>
<td>• Evaluate the various PPP structuring options accepted by the government and requirements for each option</td>
</tr>
<tr>
<td>Identification of highest impact intervention</td>
<td>• Narrow the list of potential management needs only the most critical, and those which the private sector would be uniquely suited to address</td>
</tr>
<tr>
<td></td>
<td>• Undertake root cause analysis to identify the most impactful interventions</td>
</tr>
<tr>
<td>Evaluation of Revenue Potential</td>
<td>• Evaluate the various alternatives for revenue generation to support the project, including seafood processing, port facilities, and transport options</td>
</tr>
</tbody>
</table>
The objective of this phase was to conduct a Preliminary Feasibility Study (PFS) of the identified strategy for inclusion in a potential PPP proposal. The PFS is a precursor to a full detailed Technical Feasibility Analysis to inform further development or identify fatal flaws before committing to the high cost of a full Technical Feasibility Study. PFS activities are summarized in Figure 41:

**FIGURE 41: The Seven Steps Undertaken During the Pre-Feasibility Study**

<table>
<thead>
<tr>
<th>OBJECTIVE</th>
<th>ACTIVITIES</th>
</tr>
</thead>
</table>
| Initial Screen to Establish Suitability of Selected Project | • Put selected strategy through a Multi-Criteria Analysis (MCA) screen to identify any fatal flaws before undertaking full Pre-feasibility study  
• Is it strategic for the government? Is it of sufficient scale? Does it appear to have strong public support? Are there any major social safeguard concerns, such as mass relocation requirements, that cannot be easily mitigated? Does the project have a clearly defined objective and output specifications? |
| Analysis of Current Situation | • This review included combination of desktop research, stakeholder consultation and government documentation in order to answer the following key questions:  
  - What are the key challenges and opportunities?  
  - What are the fundamental needs and business case for a viable PPP proposal?  
  - What are key datapoints and metrics under the business as usual case? |
| Initial Financial Screen | • Perform high-level cost / revenue analysis to justify continued pursuit of the identified project; used as a as an initial sanity check |
| Collection of Cost and Revenue Data | • Gather formal cost and revenue data to feed into financial model |
| Detailed Financial and Social Cost-Benefit Analysis | • Input assumptions into a detailed project finance model to project financial returns to the overall project and equity investors  
• Run a social cost-benefit analysis, including returns to investors as well as quantifiable social benefits accruing to non-investors |
| Determination of the Appropriate Route Option | • Identify the most promising PPP route option  
• The two primary route options are the “unsolicited” proposal and a “solicited” approach, though there may be others depending on the jurisdiction |
| Environmental and Social Impact Assessment | • Undertake a preliminary environmental and social impact assessment for the preferred option to identify any negative impacts and potential mitigants |
PROJECT CONSTRAINTS
Three sets of constraints bound this analysis, covering external requirements demanded by the country’s PPP regulatory framework, bankability, and the requirements for positive fisheries management impact that Encourage Capital identified to support the project’s fundamental theory of change and ability to scale. The three primary constraints that we adhered to were the following:

ADHERE TO THE PHILIPPINES PPP REGULATIONS AND PROJECT FINANCING REQUIREMENTS
The most fundamental requirement for a sustainable fisheries PPP is that it adheres to the national PPP framework and laws. While these requirements vary by jurisdiction, they are all concerned with ensuring that the project meets the national priorities and fits within the legal and institutional framework, and is of sufficient scale and bankability to ensure consideration.

DELIVER A COMPELLING VALUE PROPOSITION TO CRITICAL STAKEHOLDERS
Even the least controversial PPPs are often opposed on political or social grounds, and are highly scrutinized by elected officials and key stakeholders. Even well designed projects are destined to fail without an effective communications strategy and the right political allies. It is therefore critical to identify the primary stakeholders most likely to oppose the project, and then to offer these groups a compelling value proposition within the project proposal.

BE SCALABLE AND REPLICABLE IN ORDER TO ACHIEVE ECOSYSTEM-WIDE IMPACT
Part of the rationale in using a PPP approach to fisheries management is the ability for PPPs to catalyze significant amounts of capital to address large national or supranational public needs. The scale of fisheries management challenges requires large amounts of capital. Ecosystems don’t adhere to state boundaries, so to address ecosystem-wide challenges investment models must be replicable and highly scalable not only within a particular country but also across entire regions. Highly migratory fisheries resources fit this profile, as the sustainability of the resource is only as strong as the weakest link in the governance chain.
ANNEX D: THE NATIONAL-SCALE FISHERIES INVESTMENT PROFILE

CORE VALUE DRIVERS
Despite their complexity, time and cost to develop, and the lack of specific sustainable fisheries precedents, public-private partnerships for national fisheries management can offer a number of benefits to governments and end users when appropriately structured the provision of public infrastructure, goods and services. Encourage Capital has identified several key value drivers that support a PPP-based national-scale fisheries impact investment strategy, including:

1. The infusion of private sector technologies, innovation, and expertise to provide higher quality, lower cost public services
2. The incentives to hold the private sector accountable for delivering projects on time and within budget
3. Greater budgetary certainty and visibility by identifying present and future infrastructure costs
4. Building of local capacity and transfer of technology through joint ventures and sub-contracts with large international firms
5. Diversification of the regional economy and increased competitiveness resulting from improved fish port landing and post-harvest infrastructure in conjunction with streamlined, cost effective fisheries management tools
6. Supplementing limited public sector capacity and expertise in order to meet growing infrastructure and information technology demands
7. Creating long-term value-for-money for the government partner through appropriate risk transfer to private sector experts best positioned to assume it at a lower cost

RISKS TO CONSIDER
Because of the size and scope of the Nexus Blue Strategy, there is a wide spectrum of risk involved in the execution and operations of the proposed PPP. Cooperation between private and government entities is a critical element of this strategy, and constitutes an additional set of risks as well. Risks to the successful implementation of the Nexus Blue strategy include (but are not limited to) the following:

- Government entities may not act favorably toward the strategy, or may support an incompatible approach to MCS that renders a FIMS infrastructure component irrelevant.
- Local fishers and vessel operators may reject infrastructure changes or refuse to comply with proposed management solutions.
- The project may not be approved or may need to be extensively modified after a formal feasibility study is conducted.
- A heavy reliance on field deployment of potentially fragile monitoring and communications technology may expose the strategy to a risk of various technology failures.
- The Port facility currently has some security concerns that could manifest as vandalism risks, or risks to data infrastructure or personnel.
**STRUCTURE AND TERMS**

Although the specific structure and terms may vary by jurisdiction and project characteristics, a fisheries PPP will generally adhere to a standard project finance structure, in which equity is invested alongside non-recourse project debt supported by the stable, predictable cash flows required of a viable project. Because the structure is defined under the national PPP framework, it tends to be very standardized and must be acceptable to a wide range of potential bidders. (see Figure 42).

With long and bounded time horizons, contracted returns, a hard asset base, and project-specific investment, PPPs tend to be project financed with high levels of non-recourse project debt. In this model, a project company will be established as a special purpose vehicle (SPV), funded with equity from the private-sector partners, which would then issue debt backed by the project’s assets and cash flows, with no recourse to the partners behind the project company. The optimal capital structure will depend on a range of factors including the revenue type (concession vs. availability), project risks, credit of the public sector counterpart, but debt to equity ratios are rarely less than 1:1 and more commonly lie in the range of 70:30 to 80:20 (i.e., leverage ratios of 3.0x to 4.0x).66

PPP contracts are very long-term investments, with periods of up to 50 years in extreme cases. Investors must therefore have a long-term time horizon, and for this reason pension funds, endowments, and insurance companies are often investors, as they can match their long-term liabilities and outlook with a yield-based asset.

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