



MARITIME BLUE CAPITAL ASSESSMENT
CONSOLIDATED FINAL REPORT

SEPTEMBER 16, 2019

Supported by:



Department of Commerce



next street

WHAT THIS DOCUMENT INCLUDES

- > This deck is the full consolidated materials from Next Street's engagement with the Washington State Department of Commerce in support of the Maritime Blue strategy
- > All materials from our meetings with the project Steering Committee are presented here, with further details included in the Appendix slides
- > We have also included an Executive Summary that highlights the key findings from our industry analysis, peer cities research, and capital landscape analysis, and the 10 illustrative capital deals we identified

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X OUR OBJECTIVES AND PROCESS

Context for this work

- > The Washington Department of Commerce partnered with a diverse group of stakeholders to **develop and launch the Washington Maritime Blue Initiative**
- > Maritime Blue seeks to **promote growth in the Blue Economy**, champion maritime clean tech innovation and establish best practices, as well as seek to **identify and support enterprises that foster sustainable development** by increasing living-wage jobs, promoting a healthy environment and empowering resilient communities
- > Following the development of the initial strategic plan and the creation of the Maritime Blue Advisory Committee, we began **further research into the investment needed to grow the sector**

Objectives for the engagement

- > This work focused on research of potential funding structures to **provide investment capital to support economic growth of the maritime sector** in Washington State
- > We completed a **regional maritime capital landscape scan** to better understand the nature of the demand for capital in the maritime sector
- > Our work also **analyzed whether the supply of capital currently meets these demands**
- > Through understanding the demand, supply, and key gaps, **we developed frameworks and strategies to fill gaps with a variety of capital sources**, including public and private capital

Our Process



- > Aligned on objectives, formed hypotheses of capital needs, and conducted literature review



- > Analyzed maritime industry demand cluster data, created capital inventory and mapped of capital providers, identified gaps relative to known needs



- > Interviews and focus groups with local stakeholders in the Blue Economy, relevant capital providers, and national stakeholders who have successfully supported maritime economies



- > Synthesized interview and focus group learnings and developed illustrative deals

X BLUE ECONOMY INDUSTRY ANALYSIS: *KEY FINDINGS*

Our quantitative analysis of Washington's Blue Economy used NAICS industry codes to identify the characteristics and trends relevant to small businesses in these industries

Key Takeaways

- 1 The Blue Economy is a small, but important, element of the State of Washington's economic landscape, **accounting for 3.0% of small businesses in the state** (or roughly 5,232 small businesses as of 2016)
- 2 While the vast majority of both core maritime and non-core maritime small businesses are clustered in the Seattle-Tacoma-Bellevue MSA, some industries have substantial secondary clusters (e.g., Other Logistics in inland cities) or are geographically dispersed (e.g., Commercial Fishing & Seafood, Energy); consequently, the Dept of Commerce's **industry and geographic priorities will substantially influence each other**
- 3 While businesses across core and non-core maritime industries tend to be small, **variation in specific size, average revenue, and wages of these small businesses suggests a broad range of capital needs**; however, some **segments that are predominantly comprised of microbusinesses (<4 employees) may lack appetite or appropriate resources to scale**
- 4 All core and non-core maritime industries have **low representation of people of color and women**; it is important to **determine the extent to which lack of capital access is a factor in this gap** through further conversations with stakeholders close to these groups
- 5 The highest-growth areas for small businesses appear to be **non-core maritime industry segments (which tend to be more technology-focused) and some aspects of water transportation and shipping**; this may increase the attractiveness of prioritizing investment opportunities in these industries

X BLUE ECONOMY PEER CITIES ANALYSIS: KEY FINDINGS

We researched trends in 4 key maritime cities – Boston, Oslo, Rotterdam, and San Diego – to understand opportunities and challenges that may be relevant to Washington’s Blue Economy

1

Maritime cluster organizations are responsible for coordinating across stakeholder groups to support small and medium-sized businesses (SMBs): Several successful maritime sector initiatives in the peer cities, ranging from blue tech incubators to maritime-focused investor conferences, were made possible through coordination of multiple stakeholders across the Blue Economy, highlighting the need for a central industry partnership or organization to drive collaboration

2

Government initiatives and grants are essential support for SMBs: In each of the peer cities, maritime-specific government grants and business support programs provide key funding and services for SMB in the maritime economy, allowing early-stage SMB to develop without venture capital and creating partnerships between SMB and larger traditional maritime and/or tech corporations

3

Blue Economy incubators and accelerators help attract investment: In Rotterdam and Boston, investors have cited incubators and accelerators as a key pipeline for identifying investable opportunities in Blue Tech; these incubators provide SMBs the opportunity to develop from proof of concept through early customer acquisition on a longer timeline often required for maritime technology companies.

4

Traditional clusters are adapting to the Blue Economy: Industries of historical strength in San Diego, Boston, and Oslo (e.g., submarines, shipping and ship repair, and oil and gas) are finding new markets and applications for traditional maritime technology, evolving to succeed in the Blue Economy and provide for sustainable maritime solutions

5

Investors seek out opportunities in sectors that are familiar to them: In the U.S., the maritime SMBs that are successful in raising equity investments are typically those with broader tech applications, as there is a robust tech investment ecosystem that investors understand. However, in Norway, there is much more equity and private investment in sectors like shipping and energy, as those are the sectors that investors understand best.

X BLUE ECONOMY LOCAL CAPITAL LANDSCAPE: KEY FINDINGS (1 OF 2)

Through interviews and focus group conversations with maritime economy stakeholders both in Washington and internationally, we identified key trends and lessons related to capital access and activity in Washington's Blue Economy

- 1** **Venture capital is not seeking out maritime investments:** In our interviews, we repeatedly heard that venture capital providers are either uninterested in or unfamiliar with maritime technology, and those that demonstrated interest shared that even if they wanted to invest, traditional tech and industry would likely receive priority. The complexity and development timeline of maritime tech is a challenge for investors.
- 2** **There is a particular need for early-stage capital, especially in core maritime:** Maritime SMBs, especially those in core sectors, have long development timelines between proof of concept and profitability. In some maritime economies both domestically and internationally, accelerators and incubators provide support for maritime SMBs to develop to a point where investors are more comfortable providing capital. Additionally, maritime SMBs with technology that can be applied to other industries are prioritizing those use cases to seek capital from funders who have industry focuses beyond maritime in order to receive funding that can help them survive through the early-stage capital "valley of death".
- 3** **Government initiatives can help catalyze SMB development:** In Norway, the government provides development funding for Innovation Contracts – partnerships between a startup and a large corporation to create and launch an innovative product, typically in transportation or energy. This model provides upfront capital for the startup, reduces risk for the corporation, and stimulates developments that can then attract investors at scale. In the U.S., there are Small Business Administration-type loan funds that could be helpful for maritime SMBs, but few maritime businesses are in the pipeline for these loans. Other large, national grant programs support major research initiatives, and it may be possible for SMB to participate or support this research through their developing technology and take advantage of this capital
- 4** **Foundations and philanthropic grant capital can play a critical role in de-risking investment:** Foundations that have maritime or maritime-adjacent program areas are overwhelmingly focused on conservation (often internationally) or educational programs. To further extend this capital to support maritime SMBs, foundations could help capitalize loan-loss reserves or support additional R&D and development competitions that would identify emerging maritime SMBs, providing those businesses capital to develop to a maturity that would attract more traditional investment.

X BLUE ECONOMY LOCAL CAPITAL LANDSCAPE:

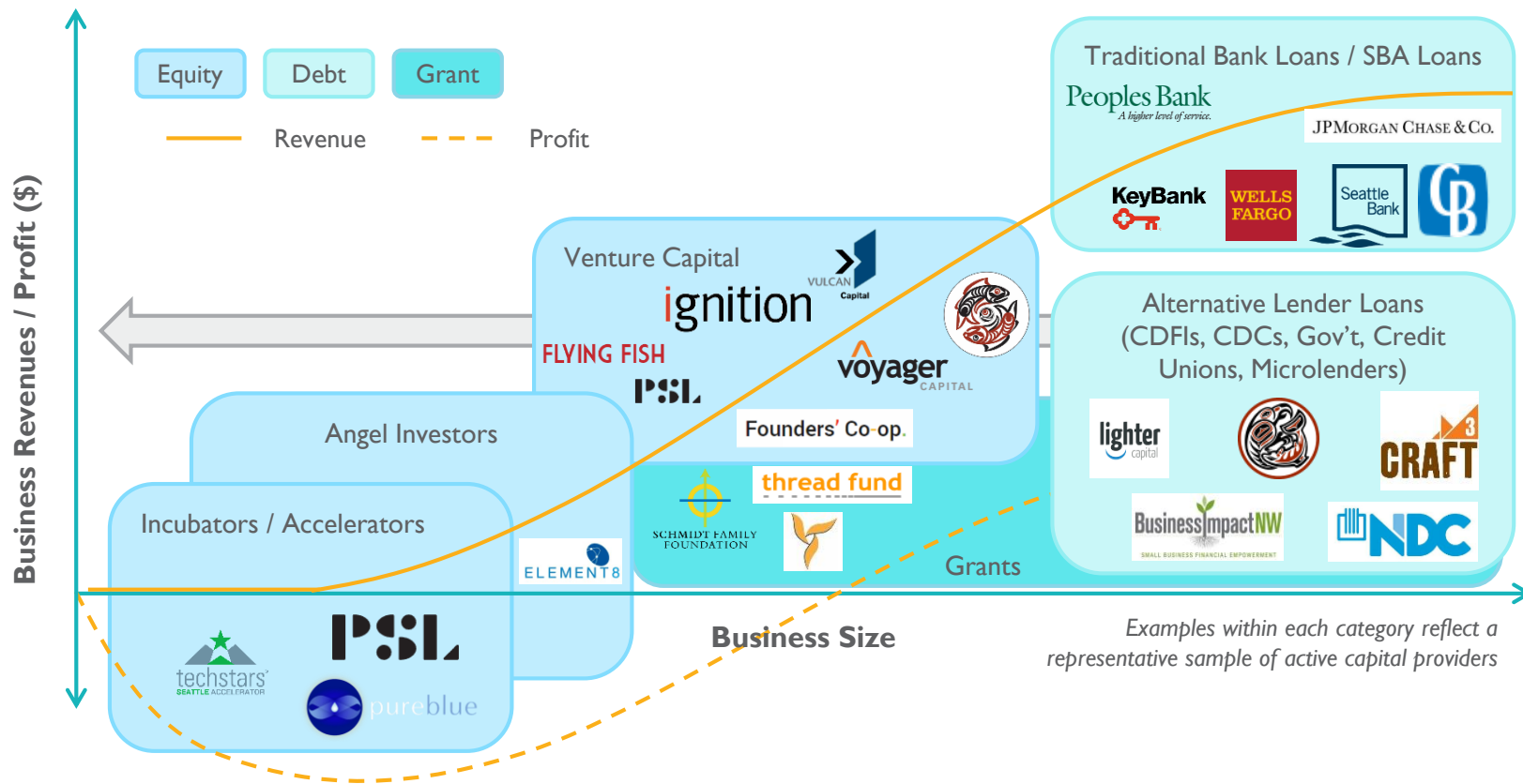
KEY FINDINGS (2 OF 2)

Additional conversations with capital landscape stakeholders and business owners helped us further develop an understanding of the local capital landscape for businesses in the Blue Economy

- 5 Building appropriate capital stacks:** Because of the reticence for local traditional equity providers to support maritime businesses at scale, each direct-to-SMB investment will require creativity and intentionality to build the right capital stack that includes first loss capital or credit enhancements from more flexible, patient providers; this is also true for public infrastructure to properly incentivize private investment to fill gaps in public financing
- 6 Bridging to non-local funding:** In order to configure the right capital stack, projects and enterprises will likely need to look outside of Washington State / Pacific Northwest to other national or international funders for financing, especially given that the local Maritime-based investment is limited, and the Seattle impact community is small
- 7 Influences of local policy on investment options:** Many potential maritime deals could benefit from public support, but will need to consider and work around public sentiment and policies to develop structures like public-private partnerships and work around limitations to direct investment in small businesses
- 8 Culture of self-funding:** Several of the core maritime businesses, especially those that own 'lifestyle businesses,' alluded to a trend in Seattle of self-financing business launch and growth leveraging personal resources or access to friends and family capital, instead of seeking external capital
- 9 Importance of technical assistance alongside capital:** Local stakeholders revealed the need for additional support alongside capital, including awareness of and navigation support of small businesses to available capital sources, education of policymakers on financial services, culture building for POC communities around opportunities in Maritime, as well as breaking down systemic barriers to lack of access for those communities

X BLUE ECONOMY LOCAL CAPITAL LANDSCAPE: ECOSYSTEM

Through interviews, focus groups, and desk research, we developed an understanding of providers serving the local Blue Economy capital landscape from venture stage to business maturity



Examples within each category reflect a representative sample of active capital providers

	Startup	Early-Stage	Growth	Mature
Availability of Capital for Core Maritime SMBs	○	◐	◑	◒
Availability of Capital for Non-Core Maritime SMBs	◐	◑	◒	◓

BLUE ECONOMY CAPITAL LANDSCAPE GAPS

Our research into the local Blue Economy capital landscape identified key gaps in the availability of capital for small businesses

- 1** **Low ceiling on loans** (~\$750k) available to early-stage businesses that are not yet bank ready
- 2** Lack of **flexible, responsible loan capital offered by CDFIs** due to limited CDFIs presence and a gap in offerings above \$100k or less than \$1m
- 3** Very **few equity providers are focused on maritime** – they are either not knowledgeable or interested because of government regulations and concern about scaling and exit potential
- 4** **Funding at the proof-of-concept / testing stage** is especially **hard to find for maritime-tech businesses**; often maritime businesses do not want to test new technology on active sites and desire funding for test sites, which can be costly and have a long-term ROI
- 5** Unlike in other maritime economies, very few local corporations are partnering with SMBs and there is **little funding to de-risk collaborations between these players**
- 6** There is **limited marketing of maritime-specific products across the capital spectrum** from grant to equity, making it difficult for small businesses to navigate what resources may be available to them
- 7** **Few options for “no-cost capital”**, like R&D grants or prize competitions targeted at maritime, which would allow start-ups to prove concept and attract additional investment

X SUMMARY OF ILLUSTRATIVE DEALS

We have identified 10 illustrative capital deals to support the development and expansion of Washington's Blue Economy

Type of Deal	#	Deal	Detail	★ Opportunity prioritized by Maritime Blue Steering Committee in July 30 th working session
Public Infra-structure	1	★ Electrification of ferries	> Investment in the retrofit of 2 existing ferries, commission 5 new hybrid power ferries, and create and install shore power	
	2	★ Port rebuilding in rural communities	> Investment to rebuild aging critical port infrastructure (e.g., breakwaters, docks) in rural communities	
Commercial Core Maritime	3	Increasing small vessel loans	> Investment in small fishing vessels by catalyzing loans between \$500k - \$1m	
	4	Transitioning to low emission marine engines	> De-risk investment in small business to convert vessel engines into environmentally sustainable engines	
	5	★ Funding MER Equipment	> Direct investment in MER Equipment to support R&D into more sustainable energy solutions	
Maritime Tech	6	★ Funding Numurus	> Direct investment in Numurus to commercialize technology and demonstrate applications in industries other than Maritime	
	7	★ Funding Olis Robotics	> Direct investment in Olis Robotics to enable them to develop software for land-based industrial robots and fund their development for the next 5 years	
	8	Support for robotics and automation technology for shipbuilding	> Catalyze innovation in robotics and automation for shipping companies by developing a research lab	
Change Drivers	9	Establishing loan loss reserve fund for CDFIs	> Investment in a loan loss reserve fund that de-risks financing from CDFIs into businesses owned by women and people of color	
	10	★ Setting up innovation contracts	> Investment to de-risk partnerships between small businesses and large corporations to promote innovation	

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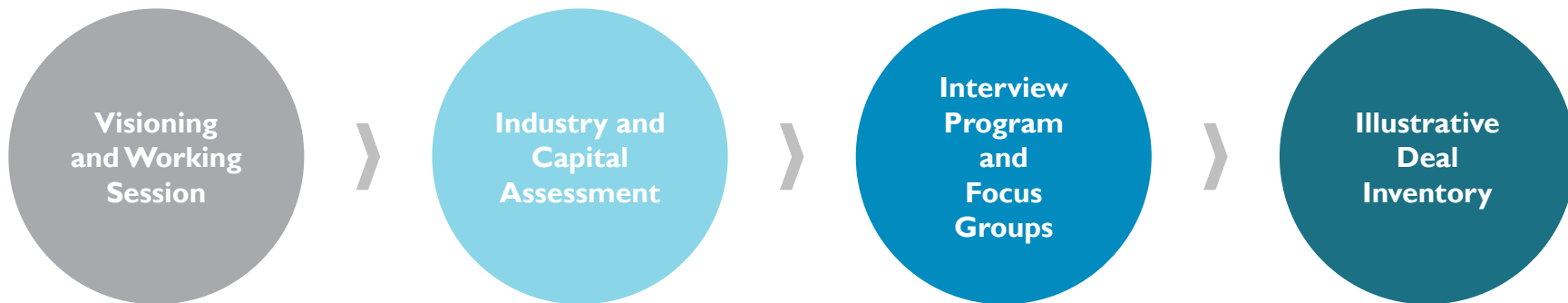
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- Full Industry Analysis

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- Illustrative Seattle Investments

X PROJECT OVERVIEW



Key Activities

- > Align on shared objectives and develop a clear vision for the work
- > Surface hypotheses about capital needs
- > Perform review of literature concerning the regional Blue Economy in general

- > Analyze maritime industry demand cluster data, including workforce and establishment trends, size and stage of business, illustrative needs
- > Creation of capital inventory and mapping of capital providers
- > Gain perspective on capital providers and flows, highlighting gaps relative to known needs, with a particular focus on segments of opportunity

- > Conduct up to 20 targeted interviews with local stakeholders in the Blue Economy, relevant capital providers, and national stakeholders who have successfully supported maritime economies
- > Conduct 3-4 focus groups with business owners participating in the Blue Economy

- > Synthesize interview and focus group learnings with capital markets research
- > List illustrative deals, surfaced through research into completed transactions, current capital needs, and perceived opportunities

Key Outputs

- > Alignment around broad outcomes and change WMB seeks to achieve
- > Synthesis of 8-10 reports on the Blue Economy, especially local and national capital flows, to serve as the grounding for our market analysis

- > Inventory of capital providers in Excel
- > PowerPoint presentation with key insights related to maritime clusters of demand, capital providers, and capital markets analyzed

- > Synthesis of takeaways from interviews and focus groups
- > Greater understanding of local and national maritime economy needs, market dynamics, and potential opportunities and illustrative transactions

- > Presentation of illustrative deals, including deal size, terms, financial return, potential impact, and strategic alignment with WMB priorities

X INTERVIEW PROGRAM: KEY INFORMANTS

We conducted conversations with 26 local, national, and international stakeholders to gain a range of perspectives on capital availability and needs in the Maritime industry

Local Stakeholders

- > **Ryan Vogel & Stefano Mazzilli**, ED & Partnerships & Technical Strategy, PureBlue
- > **Kyle Mannis**, Project Manager, Vigor
- > **Dan Berentson**, Director, Skagit County Public Works
- > **Frank Paganelli**, Chair of Startups & Emerging Companies, Lane Powell
- > **Jodie Toft**, Deputy Director, Puget Sound Restoration Fund

Capital Providers

Equity Investors

- > **Eric Berman**, President, Element 8
- > **James Newall**, Partner, Voyager Capital
- > **Ben Rush**, Business Associate, Pioneer Square Labs
- > **Tim Porter**, Partner, Madrona

Debt Investors

- > **Tim Lennox**, Seafood Group Head, Key Bank
- > **Roland Chaiton**, SVP / Sr. Loan Officer / Director of Strategic Initiatives, Business Impact NW
- > **Chuck Depew**, West Team Leader, NDC
- > **Curtis “Arne” Arnesen**, Commercial Market Leader – Maritime, Peoples Bank WA
- > **Joe Silver**, VP Finance, Lighter Capital

Philanthropic Investors

- > **Tim Crosby**, Principal, The Thread Fund
- > **Sayer Jones**, Director of Mission-Related Investing, Meyer Memorial Trust
- > **Carol Dahl**, President, Lemelson Foundation
- > **Fabiola Greenawalt**, Program Officer, Russell Family Foundation

Nat'l / Int'l / Peer Cities

- > **Gro Eirin Dyrnes**, Regional Director for the Americas, Innovation Norway
- > **Greg Murphy**, CEO, Blue Economy Strategies (San Diego)
- > **Mark Huang**, Managing Director, SeaAhead (Boston)
- > **Anders Mikkelsen**, Director of Business Development, DNV GL
- > **Melissa Fischel**, Education & Workforce Development, Maritime Alliance (San Diego)
- > **Chuck Depew**, West Team Leader, National Development Council
- > **Merijn Zondag**, Director, PortXL (Rotterdam)

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X INDUSTRY ANALYSIS: OUR APPROACH

Using sector classifications from the North American Industry Classification System (NAICS), we conducted a quantitative analysis of both “core” and “non-core” maritime industries, including only the most relevant subsectors within non-core industries



Our Process

Definition of Key Industry Segments

- > Identified types of industry segments and businesses that should be included in the analysis of the maritime sector
- > Grouped industry segments into “Core Maritime” and “Non-Core Maritime” categories for ease of analysis
- > Mapped NAICS codes that correspond to each industry segment / sub-segment

Industry Analysis (Leveraging Census Bureau & ArcGIS Data)

- > Determine each maritime industry segment’s size, in terms of number of small businesses and number of employees
- > Analyze small businesses’ share of total firms in each segment
- > Map and analyze the geographic distribution of small businesses in each industry segment across the state of WA
- > Analyze key other key firm metrics in each industry segment (e.g., average wages relative to local living wage, average revenue per firm)
- > Calculate and compare growth rates for each industry segment
- > Determine the demographic breakdown of business ownership in each industry segment and evaluate segment’s representativeness, relative to the state’s overall population breakdown

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Key Takeaways

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PEER CITY CASE STUDIES: OVERVIEW

- > As part of this engagement, we created **four case studies** of other **cities with major maritime economies**
- > The objectives of these case studies were to:
 - Understand **maritime economy activity in other cities to help inform opportunities** for Washington State and Maritime Blue
 - Identify **key challenges and best practices** to be considered as we develop our capital assessment and illustrative deals
- > Similar to the capital landscape assessment, these case studies were a culmination of **interviews with key stakeholders, desk research, and our team's collective experience** supporting SMB ecosystems across the country

X PEER CITY CASE STUDIES: *HOW WE CHOSE CITIES*

We identified 4 peer cities to be the focus of our case studies

CITY *of* BOSTON



Oslo



Gemeente Rotterdam



Selection Criteria

Maritime economies

- > Each of these cities has a robust and diversified maritime economy, with economic activity distributed across a wide range of maritime industrial clusters

Investment activity

- > Preliminary desk research identified maritime investment activity in each of these cities, and our case studies revealed additional investment activity that can serve as a model for illustrative deals proposed through our work

Access to stakeholders

- > Through our interviews, we spoke to key maritime and capital stakeholders that provided essential context and information to inform our case studies and help develop our research

X BLUE ECONOMY PEER CITIES ANALYSIS: *KEY FINDINGS*

We researched trends in 4 key maritime cities – Boston, Oslo, Rotterdam, and San Diego – to understand opportunities and challenges that may be relevant to Washington’s Blue Economy

1

Maritime cluster organizations are responsible for coordinating across stakeholder groups to support SMBs: Several successful maritime sector initiatives in the peer cities, ranging from blue tech incubators to maritime-focused investor conferences, were made possible through coordination of multiple stakeholders across the Blue Economy, highlighting the need for a central industry partnership or organization to drive collaboration

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Government initiatives and grants are essential support for SMBs: In each of the peer cities, maritime-specific government grants and business support programs provide key funding and services for SMB in the maritime economy, allowing early-stage SMB to develop without venture capital and creating partnerships between SMB and larger traditional maritime and/or tech corporations

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Blue Economy incubators and accelerators help attract investment: In Rotterdam and Boston, investors have cited incubators and accelerators as a key pipeline for identifying investable opportunities in Blue Tech; these incubators provide SMBs the opportunity to develop from proof of concept through early customer acquisition on a longer timeline often required for maritime technology companies.

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Traditional clusters are adapting to the Blue Economy: Industries of historical strength in San Diego, Boston, and Oslo (e.g., submarines, shipping and ship repair, and oil and gas) are finding new markets and applications for traditional maritime technology, evolving to succeed in the Blue Economy and provide for sustainable maritime solutions

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Investors seek out opportunities in sectors that are familiar to them: In the U.S., the maritime SMBs that are successful in raising equity investments are typically those with broader tech applications, as there is a robust tech investment ecosystem that investors understand. However, in Norway, there is much more equity investment in sectors like shipping and energy, as those are the sectors that investors understand best.

X PEER CITY CAPITAL ACTIVITY: ILLUSTRATIVE DEALS

CITY of BOSTON

- > In 2018, the **Massachusetts Technology Collaborative announced a new grant initiative that would allocate up to \$500,000** for innovation in seaport communities; the grant program is accepting a wide range of potential solutions, including those related to fisheries, shipping, and renewable energy
- > Boson-based **Sea Machines Robotics closed a \$10m Series A round in 2018**; the round was led by Accomplice Capital, a Cambridge-based venture firm, but included investors from across the U.S.
- > In 2018, **Shell's New Energies division partnered with EDP Renewables on a \$135M bid** to develop wind farms offshore of the Boston harbor



Oslo

- > In 2017, Innovation Norway's export credit program helped fund the conversion of a Danish container ship to hybrid power with a **guaranteed \$1m loan**; **Norwegian Electric Systems provided the batteries for the ship**, which were then installed at a shipyard in the Faroe Islands
- > In 2018, Longship, an **Oslo-based private equity firm, acquired 100% of Nofitech, a Norwegian small business that develops aquaculture technology**; in 2017, Nofitech had approximately \$10M in revenue and 6 employees
- > Several shipping companies, including some based in Oslo, **joined together in 2017 to build a \$150m fund to provide alternative financing to shipping companies** both in Norway and around the world



Gemeente Rotterdam

- > **Dutch bank ING and the European Investment Bank have each contributed €150m** to support projects with a "green innovation element" in Europe's maritime sector; one early investment was 110m to a Dutch shipping company to retrofit 42 ships with exhaust gas cleaning systems and ballast water management systems
- > Over the past 2 years, **Mainport Innovation Fund, a Dutch fund investing in logistics and transport**, has invested more than €7m in seed and Series A funding for Netherlands-based maritime technology firms
- > **A German maritime technology investment firm, TecPier**, announced earlier this year that they will explore investments between €200k and €250k for companies that have completed Rotterdam-area accelerator programs



- > In 2016, the Port established the Blue Economy Incubator **to remove "barriers to ocean entrepreneurs and provide key assets and services focused on pilot project facilitation"**
- > Ocean Aero, which designs unmanned vehicles that operate both on the ocean surface and underwater, **closed a multi-million Series B in 2018 and has several corporate investors**, including Teledyne and Lockheed Martin
- > In 2018, **BlueNalu, a startup developing technology to grow seafood directly from fish cells, closed a \$4.5m seed round** just 2 months after announcing their launch; the round was led by New Crop Capital, a NYC-based food science venture fund
- > Aquacycles, a recreational water-borne bicycle company, was **able to raise funding through the 2018 Blue Tech Week pitchfest**

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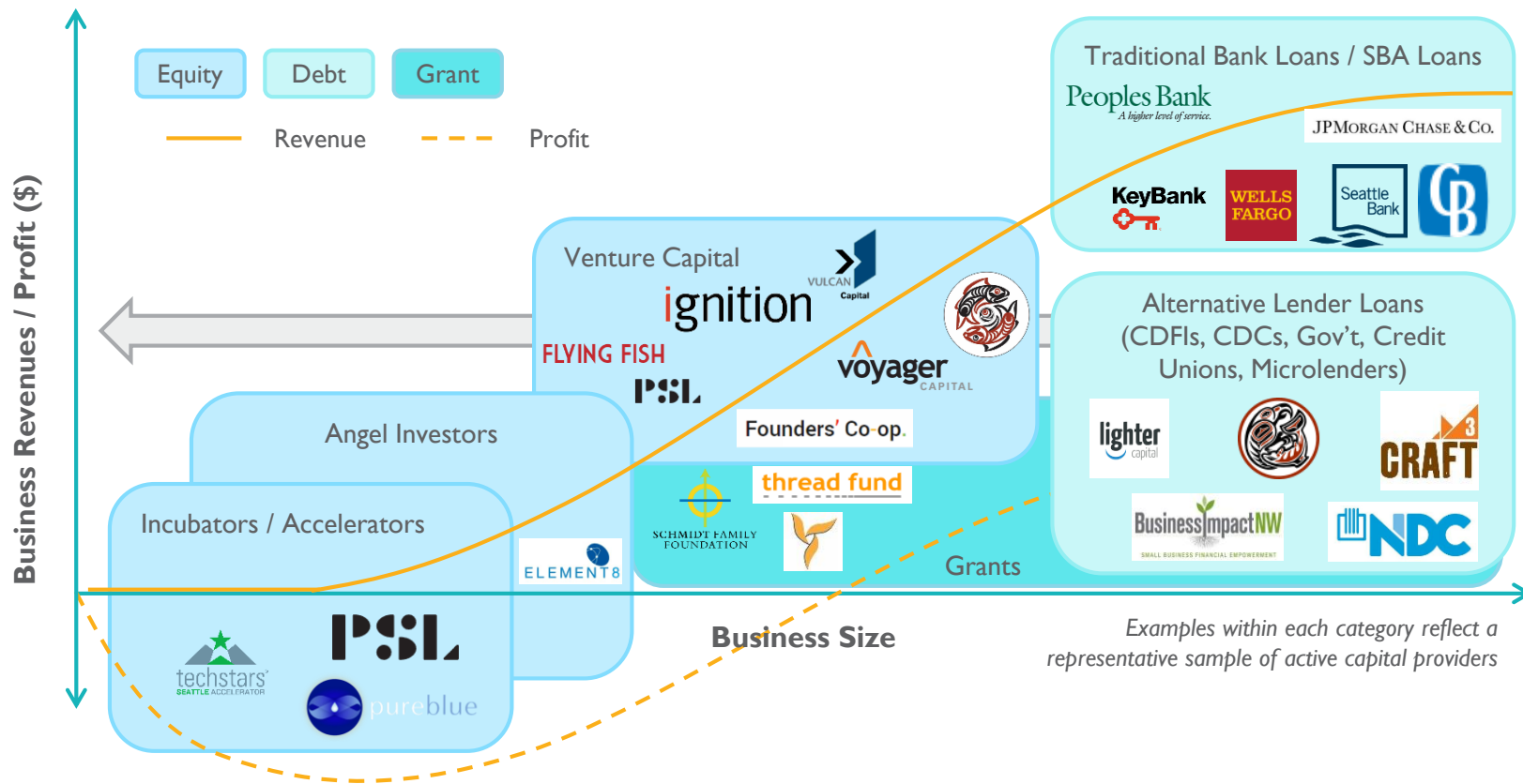
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Examples within each category reflect a representative sample of active capital providers

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X BLUE ECONOMY LOCAL CAPITAL LANDSCAPE:

KEY FINDINGS (1 OF 2)

Through interviews and focus group conversations with maritime economy stakeholders both in Washington and internationally, we identified key trends and lessons related to capital access and activity in Washington's Blue Economy

1 **Venture capital is not seeking out maritime investments:** In our interviews, we repeatedly heard that venture capital providers are either uninterested in or unfamiliar with maritime technology, and those that demonstrated interest shared that even if they wanted to invest, traditional tech and industry would likely receive priority. The complexity and development timeline of maritime tech is a challenge for investors.

2 **There is a particular need for early-stage capital, especially in core maritime:** Maritime SMBs, especially those in core sectors, have long development timelines between proof of concept and profitability. In some maritime economies both domestically and internationally, accelerators and incubators provide support for maritime SMBs to develop to a point where investors are more comfortable providing capital. Additionally, maritime SMBs with technology that can be applied to other industries are prioritizing those use cases to seek capital from funders who have industry focuses beyond maritime in order to receive funding that can help them survive through the early-stage capital "valley of death".

3 **Government initiatives can help catalyze SMB development:** In Norway, the government provides development funding for Innovation Contracts – partnerships between a startup and a large corporation to create and launch an innovative product, typically in transportation or energy. This model provides upfront capital for the startup, reduces risk for the corporation, and stimulates developments that can then attract investors at scale. In the U.S., there are SBA-type loan funds that could be helpful for maritime SMBs, but few maritime businesses are in the pipeline for these loans. Other large, national grant programs support major research initiatives, and it maybe possible for SMB to participate or support this research through their developing technology and take advantage of this capital

4 **Foundations and philanthropic grant capital can play a critical role in de-risking investment:** Foundations that have maritime or maritime-adjacent program areas are overwhelmingly focused on conservation (often internationally) or educational programs. To further extend this capital to support maritime SMBs, foundations could help capitalize loan-loss reserves or support additional R&D and development competitions that would identify emerging maritime SMBs, providing those businesses capital to develop to a maturity that would attract more traditional investment.

X BLUE ECONOMY LOCAL CAPITAL LANDSCAPE:

KEY FINDINGS (2 OF 2)

Additional conversations with capital landscape stakeholders and business owners helped us further develop an understanding of the local capital landscape for businesses in the Blue Economy

- 5 Building appropriate capital stacks:** Because of the reticence for local traditional equity providers to support maritime businesses at scale, each direct-to-SMB investment will require creativity and intentionality to build the right capital stack that includes first loss capital or credit enhancements from more flexible, patient providers; this is also true for public infrastructure to properly incentivize private investment to fill gaps in public financing
- 6 Bridging to non-local funding:** In order to configure the right capital stack, projects and enterprises will likely need to look outside of Washington State / Pacific Northwest to other national or international funders for financing, especially given that the local Maritime-based investment is limited, and the Seattle impact community is small
- 7 Influences of local policy on investment options:** Many potential maritime deals could benefit from public support, but will need to consider and work around public sentiment and policies to develop structures like public-private partnerships and work around limitations to direct investment in small businesses
- 8 Culture of self-funding:** Several of the core maritime businesses, especially those that own 'lifestyle businesses,' alluded to a trend in Seattle of self-financing business launch and growth leveraging personal resources or access to friends and family capital, instead of seeking external capital
- 9 Importance of technical assistance alongside capital:** Local stakeholders revealed the need for additional support alongside capital, including awareness of and navigation support of small businesses to available capital sources, education of policymakers on financial services, culture building for POC communities around opportunities in Maritime, as well as breaking down systemic barriers to lack of access for those communities

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X DEBT LANDSCAPE: KEY TAKEAWAYS

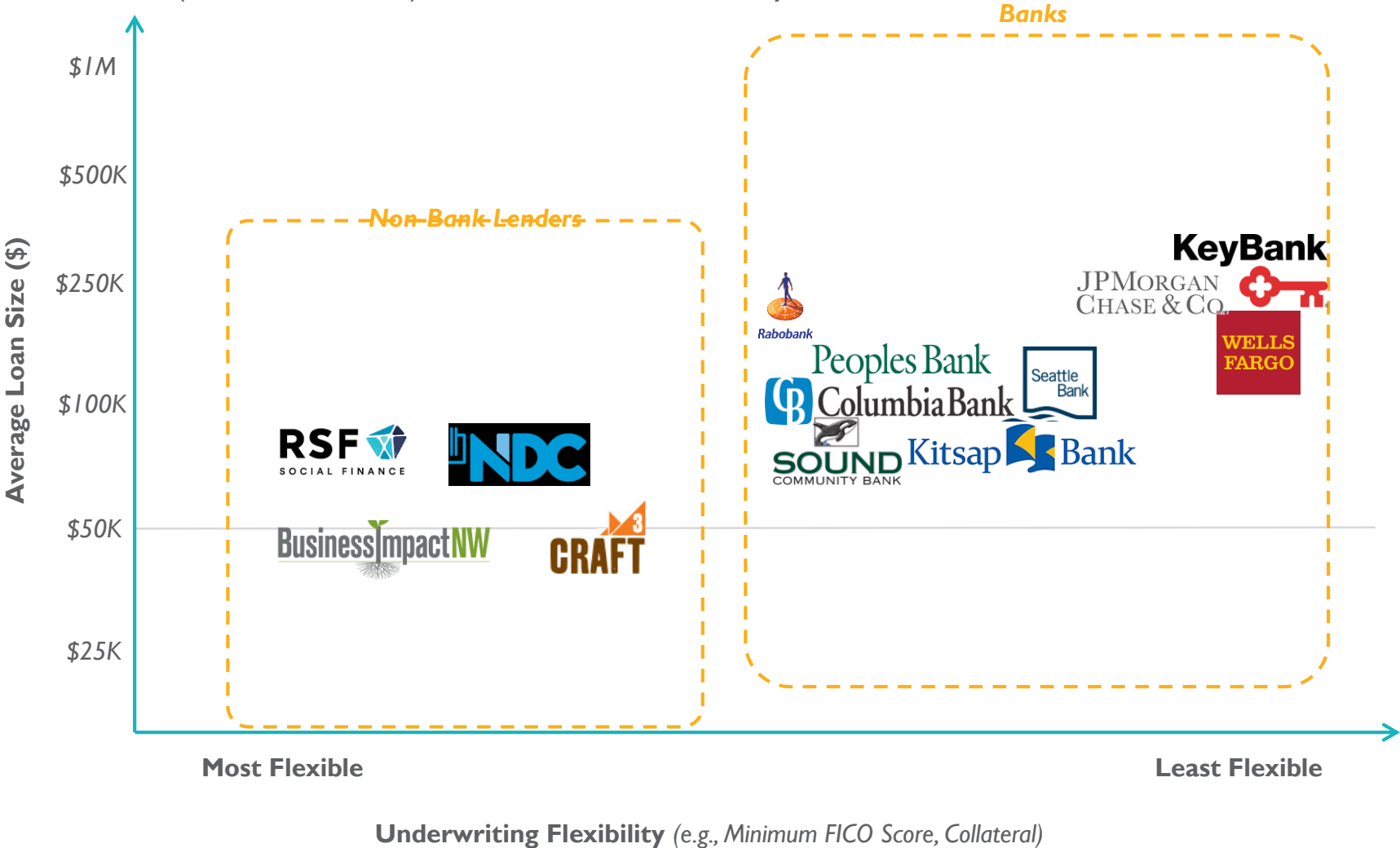
While there are several potential debt capital sources for small maritime businesses, capital-intensive startups and more established businesses that are seeking larger loans, but still building credit, face challenges

Key Findings

- > Maritime businesses can look to a wide variety of lenders for financing, but it is **rare to find lenders that have specifically branded maritime products or programs**
 - Most lenders have industry-agnostic offerings, though some community banks (e.g., Peoples Bank) and CDFIs (e.g., Craft3) have special maritime-focused teams or lending initiatives
- > While lenders currently offer a **wide range of loan sizes** – from microloans through multi-million-dollar loans – there appears to be a **low ceiling on the amount of capital available to startups and low-collateral businesses**
 - Alternative lenders (e.g., CDFIs) that serve early-stage businesses in LMI communities tend to offer microloans and other small loans (e.g., Business Impact NW’s median loan size is \$49K), while banks will more routinely make larger loans of several hundred thousand dollars or more
 - There may be significant challenges for entrepreneurs in capital-intensive maritime sub-sectors that need higher-dollar, longer-term loans to start or sustain their businesses
 - Consequently, “handoffs” or graduation from one type of lender to another (e.g., from CDFIs to commercial banks) may be difficult
- > There also appears to be a **limited number of alternative lenders** that can cater to smaller, less established businesses, which further exacerbates this gap
- > **Lenders that offer larger loans** – especially commercial banks – tend to have the **most stringent credit and track record requirements** and the lowest level of focus and expertise in the maritime industry

X LOCAL MARITIME DEBT PROVIDER LANDSCAPE: *UPDATED*

Local debt providers offer loans up to \$1m or more, but there are fewer providers offering the smaller loans (\$50k and below) that small businesses may need



X NATIONAL BANKS

National commercial banks offer a wide range of industry-agnostic small business loan products that can be applicable for maritime businesses, but their stringent underwriting (especially compared to other lenders) place their loans out of reach for many startups and business owners without established / strong credit history or collateral

Illustrative Products

- Term loans
- Lines of credit
- Equipment loans

Industries Served

Core Maritime	Non-Core Maritime
X	X

Stage of Business Served

Startup	Early	Growth	Mature
		X	X

Relevant Players



Key Takeaways

- > Large national commercial banks tend to **offer several productized small business loans** targeted toward different business needs, but these tend to be **industry-agnostic**
 - Banks may offer both secured and unsecured versions of their term loans and lines of credit, in addition to equipment loans
 - Some banks (like KeyBank Capital Markets) have maritime practice areas, these are focused on large companies (\$20M+ EBITDA) looking for investment banking and advisory services; smaller companies looking for financing rely on standard, industry-agnostic loan products
- > While these banks can offer larger loans than other lenders, they also tend to have **more stringent requirements around credit scores and years in business** – especially on their more versatile loan products

Case Example

- Wells Fargo's Advancing Term Loan (a line of credit that converts its balance to a loan after a set period of time) is catered toward businesses with \$2M to \$5M in annual sales

X COMMUNITY BANKS

Community banks are smaller, locally- or regionally-focused lenders that tend to offer industry-agnostic loan products, but may also have specialized practice areas or teams that focus on important industries in their areas

Illustrative Products

- Term loans
- Lines of credit

Industries Served

	Core Maritime		Non-Core Maritime	
	X		X	
Stage of Business Served	Startup	Early	Growth	Mature
		X	X	X

Stage of Business Served

Relevant Players

Peoples Bank

First Federal



Kitsap Bank



Columbia Bank

Key Takeaways

- > Community banks rooted in the Pacific Northwest appear **more likely than major national commercial banks to have explicit / marketed maritime lending practices**
- > Community banks also offer **general, industry-agnostic small business loans that may be more suited to non-core maritime businesses** (e.g., those that look more like technology companies than traditional maritime businesses)
- > However, community banks tend to have **collateral and track record (e.g., years in operation) requirements** that can make it difficult for startup businesses and LMI / under-collateralized business owners to attain loans; they also are **sometimes reluctant to make microloans or other small loans**
 - “The challenge is small scale – anything under \$100K is barely worth the free coffee in the lobby, from the lender’s point of view”

Case Example

- > Peoples Bank has a **commercial lending team that is devoted specifically to maritime lending** and is located near the Fisherman’s Terminal and the North Pacific Fishing Fleet
 - The team offers a wide variety of loans, including: boat loans, fishing quota and permit loans, equipment financing, shipyard financing, operating lines of credit, etc.
 - In 2017, Peoples Bank financed over half a dozen new vessels

X ALTERNATIVE LENDERS

Community development financial institutions (CDFIs) are the most flexible lenders in terms of requirements around credit, collateral, and years in business; however, they are often more capital-constrained than large banks and have lower upper-bounds on loan size

Illustrative Products

- Term loans
- Lines of credit

Industries Served

	Core Maritime	Non-Core Maritime
	X	X

Stage of Business Served

	Startup	Early	Growth	Mature
	X	X		

Relevant Players



Key Takeaways

- > **Maritime lending is not an explicit priority** for local CDFIs, as these lenders tend to **focus more on reaching traditionally underserved business owners (e.g., people of color, women, LMI) and early-stage businesses** in general
 - Maritime likely represents a relatively small fraction of CDFIs' lending; for example, 2/3 of Business Impact NW's lending is in the service industry, followed by retail
 - However, maritime is certainly among their practice areas; earlier this year, Craft3 signed on to help originate and service loans for the Local Fish Fund – a loan program for small fishing businesses in Alaska
- > These lenders' **deep ties to tribes, communities of color, and women entrepreneurs could make them natural partners** for increasing maritime investment in business owners with those backgrounds
 - NDC also manages 3 loan funds in smaller counties with high maritime presence and could help increase maritime lending in these communities
- > These CDFIs often work with borrowers with fewer years in business, lower credit scores, and less collateral than community and commercial banks, but they **tend to make relatively small loans, which can create challenges for non-bankable businesses with higher capital needs**
 - While CDFIs can lend across the continuum (e.g., Craft3 markets loans up to \$3M), they tend to deploy microloans and small loans (e.g., Business Impact NW's median loan is \$49K)

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X EQUITY LANDSCAPE: KEY TAKEAWAYS

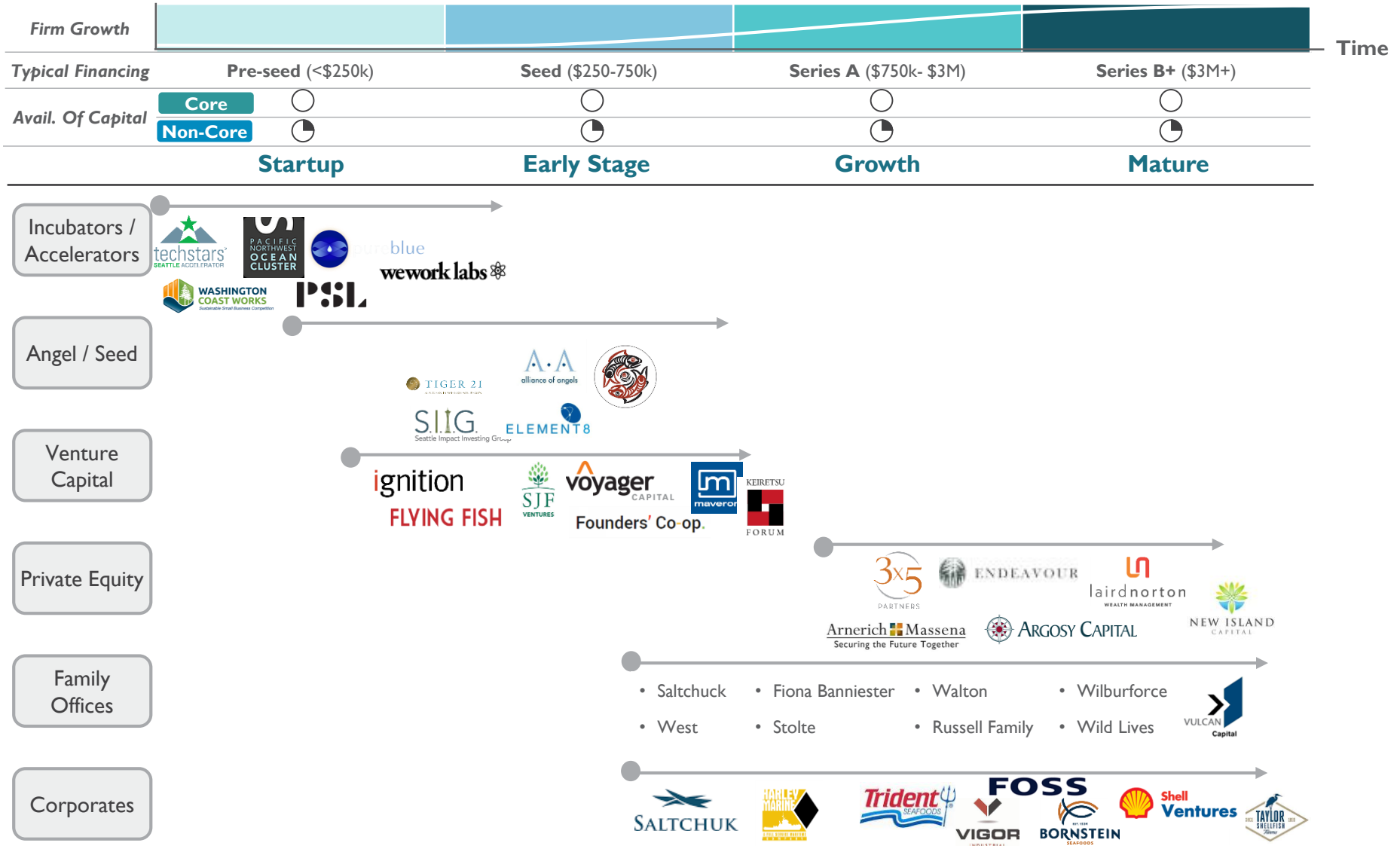
Equity investment in maritime industries is very limited, but some alternatives to traditional equity (e.g., revenue-based financing) could be more feasible and attractive investment avenues

Key Findings

- > Washington-based venture capital firms have **little familiarity with maritime industries, which limits potential deal flow**
 - Significant education on potential maritime opportunities is needed before venture investors would consider this sector
 - Technology companies that have products with other non-maritime use cases sometimes attract investment, but usually predominantly on the merits of the non-maritime applications / markets
- > However, even those with more knowledge of maritime industries often express **concern about small businesses' ability to scale within their exit timeframes and return targets**, as well as the fact that **revenue and innovation are often driven by regulatory pressures**
- > While direct investment from large, established corporations that could benefit from small companies' offerings could theoretically fill this gap, **it is rare for large, local maritime corporations to have venture arms**
 - This trend appears to be more pronounced in Washington than around the globe (e.g., in Singapore or Norway), and it may be more pronounced in shipbuilding than in shipping or other more commercial or tech-enabled businesses
- > Some investment firms / groups are piloting **alternatives to traditional equity (e.g., revenue-based financing and convertible debt)**, which could be more aligned with maritime market dynamics
 - However, maritime is not a major focus area for these businesses, so alternative financing for maritime businesses is likely still relatively rare
- > There are **also some players in the more traditional local equity landscape**, including Carlyle (via acquisition of Vigor), Endeavour Capital, and 3x5 Partners

X BLUE ECONOMY EQUITY INVESTOR ECOSYSTEM

Our research identified the following local equity investors across the spectrum of business capital needs



X VENTURE CAPITAL

Washington is home to several VC firms that invest primarily in early-stage technology-focused companies. However, VC firms have very little footprint in the maritime industry, and equity investment in maritime small businesses is rare – even in maritime technology

Illustrative Products

- Equity investment

Industries Served

Core Maritime Non-Core Maritime

X

Stage of Business Served

Startup Early Growth Mature

X

X

Relevant Players

FLYING FISH



MADRONA VENTURE GROUP



SJF VENTURES



ignition

voyager CAPITAL

Key Takeaways

- > With the exception of specialized, mission-driven funds (e.g., Salmon Investment Fund), WA-based venture capital firms **tend not to have maritime portfolios**
- > This is due, in large part, to the fact that the growth trajectory for maritime industries – especially in the core industries, but also in non-core maritime – **do not align well with venture capital firm’s exit timelines and target returns**
 - “I question the suitability of traditional maritime for VC funding – it’s the wrong type of capital”
 - “Very few maritime technologies can scale to \$1B+ in 7-8 years, which is the typical VC target”
- > While some non-core maritime (especially software/tech) could be attractive to VC firms, **concerns and lack of awareness of opportunities, market dynamics, and demand remain important barriers to deal flow**
 - “One of the challenges is lack of visibility and understanding of maritime”
 - “Regulations drive much of the maritime innovation, and it’s hard to build an 8-year revenue curve when you can’t predict regulations”
 - “We do not have much knowledge of global maritime investors and partners”

X CORPORATIONS

Unlike in some industries, in which it is common to see large corporations establishing venture arms and incubators to help grow and leverage startups aligned with their market strategies, major corporations in maritime industries appear to do so infrequently

Illustrative Products

- Venture capital

Industries Served

	Core Maritime		Non-Core Maritime	
	X		X	
Stage of Business Served	Startup	Early	Growth	Mature
			X	X

Stage of Business Served

Relevant Players



Key Takeaways

- > While there are some major multinational maritime corporations that have – or have historically had – venture arms, there is **little evidence of large Washington-based firms incubating or investing directly in small businesses**
 - BW Singapore (the world’s largest shipping company) has a VC arm and uses its fleet as a test-bed for new technology; DNV GL spun out a venture firm several years ago
 - However, a representative of a local shipbuilding company noted: “I don’t see corporations investing in small businesses or doing R&D agreements....I’m familiar with other industries doing that, but it’s on a much, much smaller scale in the maritime industry”
- > Large-scale shipbuilding leaders – especially in naval shipbuilding – seem less likely than more commercially-oriented shipping firms to invest in small businesses, **largely due to factors related to risk management**
 - “This [shipbuilding] is an old-school industry...there isn’t a lot of tech that people do. It’s also a risk-averse industry”
 - “If there were a way we could work collaboratively with someone and de-risk the investment, some sort of collaborative R&D could be attractive....being able to do the work on test pieces would be helpful so we aren’t testing new tech on a Navy destroyer”

X ALTERNATIVE “EQUITY” PROVIDERS

Alternative “equity” providers are firms / funds / investor groups that offer investments that are more flexible than traditional equity (e.g., revenue-based financing and convertible debt). While no identified firms have large maritime portfolios, their more flexible approach may lend itself more readily to the growth profile and needs of maritime businesses

Relevant Players



Illustrative Products	<ul style="list-style-type: none"> Revenue-based financing Convertible debt 			
	Core Maritime		Non-Core Maritime	
Industries Served	X		X	
Stage of Business Served	Startup	Early	Growth	Mature
		X	X	

Key Takeaways

- > Alternatives to traditional equity are likely **more suited to the needs and growth potential of maritime businesses**
 - “We are still experimenting, and where I think we’ll find some interesting models is doing more profit-sharing types of things”
 - “It’s a function of capital needs and return potential and scalability...that makes alternative investment strategies more attractive”
 - “The idea is to provide a high-probability way for investors to get a return and still get some participation in the event of a success”
- > However, identified alternative investors **do not appear to be making high-volume investment in maritime**
 - “A small amount of our business is focused on maritime....directly, under 10% of the investment we do is in maritime....indirectly, this number is higher (e.g., because of clean water)”
 - “We work exclusively in clean tech....we have seen some plays around renewable energy using waves / tidal energy”

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X FOUNDATIONS

Foundations offer philanthropic capital through program- and mission-related investments in addition to grants, but philanthropic capital in the maritime space is largely focused on education and sustainability, and only a few players have program areas specific to maritime opportunities

Illustrative Products

- Program-related investment
- Mission-related investment
- Grants

Industries Served

	Core Maritime		Non-Core Maritime	
	X		X	
	Startup	Early	Growth	Mature

Stage of Business Served

Relevant Players



Key Takeaways

- > **Limited number of foundations have maritime-specific program areas** beyond clean-up and conservation education
 - The Schmidt Family Foundation (Schmidt Martine Technology Partners), Russell Family Foundation (Puget Sound, Puyallup Watershed Initiative), and the Packard Foundation (Ocean) are among the only foundations identified that have maritime-specific program focuses
- > Foundations are generally **focused on maritime education and sustainability efforts**
 - Several foundations researched provide grants to schools, communities, and other civic organizations for environmental and watershed cleanup, school-based environmental education programs, and other sustainability efforts
 - These funding efforts are not primarily focused on funding emerging blue tech solutions
- > Foundations have an **opportunity de-risk investments from other capital providers**
 - Foundations could make key contributions to funding CDFIs or capitalizing a loan-loss reserves in an effort to provide maritime capital without directly funding for-profit businesses

X GOVERNMENT GRANTS AND LOANS

A small number of maritime-specific government grant programs exist, but they are focused on a narrow set of use cases; while this can help support traditional maritime industry, research institutions such as the APL, and more established SMB, there is limited funding available for early-stage maritime businesses

Illustrative Products

- Grants
- Loans

Industries Served

Core Maritime Non-Core Maritime

X X

Stage of Business Served

Startup	Early	Growth	Mature
	X	X	X

Relevant Players



Key Takeaways

- > **Some grants are available** to small business for certain specific uses across both non-core and core maritime
 - The Washington State Department of Commerce Export Voucher Program provides some support for SMB doing international business; however, funding is limited to \$5k, and is only offered to firms that have been in business for at least a year and “demonstrate export readiness”
 - The US DOT Maritime Administration offers up to \$20M a year through the Small Shipyard Grant Program; shipyards must be based in a single geographic location and use the funds for improvement projects or employee training
- > Identified government loan programs have **structure and requirements similar to SBA loans**
 - The Skagit County Revolving Loan Fund is an SBA-loan type program that provides up to \$500K for equipment or real estate or working capital
 - This loan fund is only available to business with at least 2 years in operation and who meet loan eligibility criteria (including sufficient revenue to cover the debt), making it difficult for startups to take advantage; it also does not have a strong track record of funding maritime businesses

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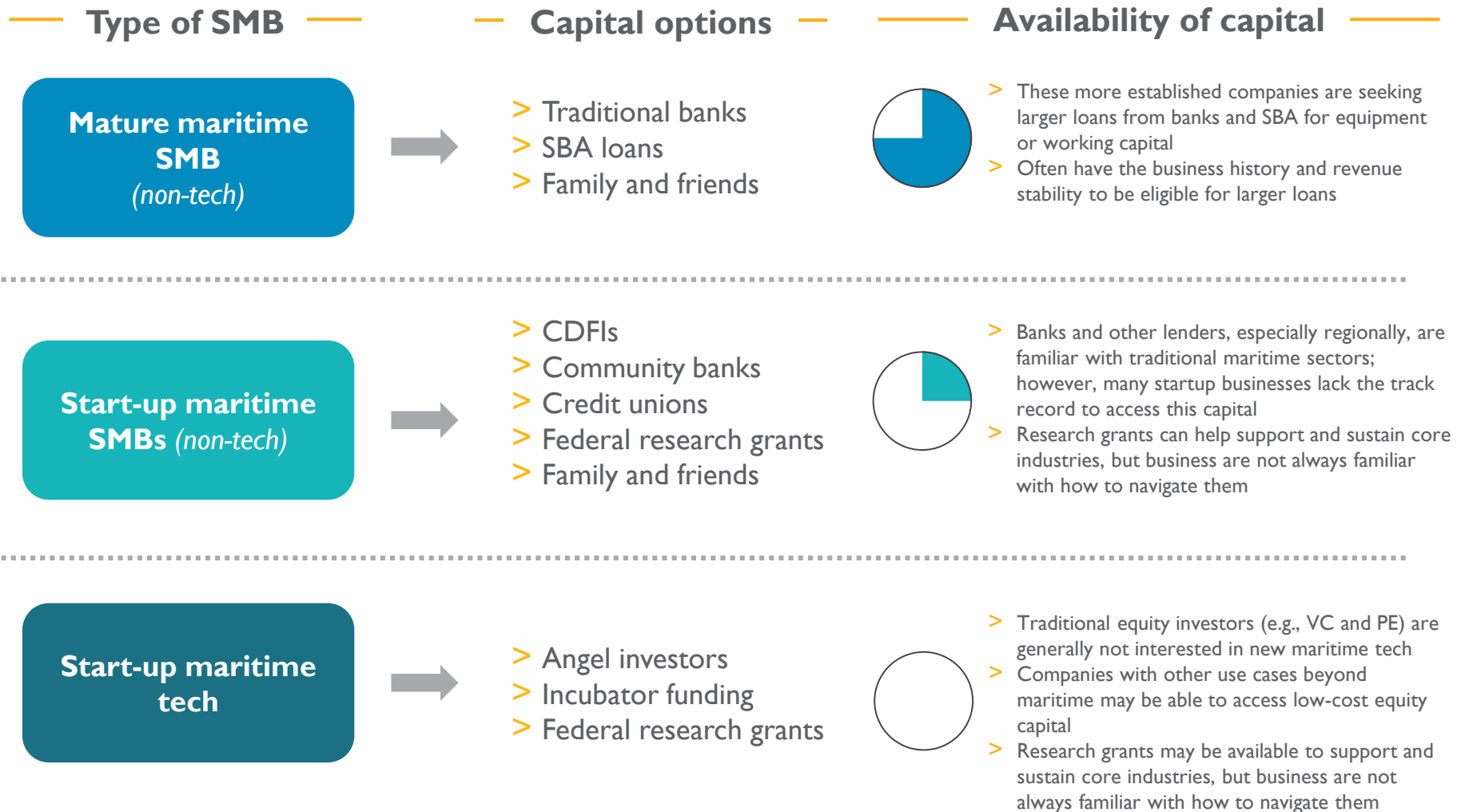
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X AVAILABILITY OF CAPITAL BY INDUSTRY

Our analysis found that capital is available for mature maritime businesses, but startups in both maritime technology and traditional maritime companies struggle to find investors who understand or are interested in this sector



X CAPITAL LANDSCAPE ANALYSIS: IDENTIFIED GAPS

Our research into the local Blue Economy capital landscape identified key gaps in the availability of capital for small businesses

- 1 **Low ceiling on loans** (~\$750k) available to early-stage businesses that are not yet bank ready
- 2 Lack of **flexible, responsible loan capital offered by CDFIs** due to limited CDFIs presence and a gap in offerings above \$100k or less than \$1m
- 3 **Very few equity providers are focused on maritime** – they are either not knowledgeable or interested because of government regulations and concern about scaling and exit potential
- 4 **Funding at the proof-of-concept / testing stage** is especially **hard to find for maritime-tech businesses**; often maritime businesses do not want to test new technology on active sites and desire funding for test sites, which can be costly and have a long-term ROI
- 5 Unlike in other maritime economies, very few local corporations are partnering with SMBs and there is **little funding to de-risk collaborations between these players**
- 6 There is **limited marketing of maritime-specific products across the capital spectrum** from grant to equity, making it difficult for small businesses to navigate what resources may be available to them
- 7 **Few options for “no-cost capital”**, like R&D grants or prize competitions targeted at maritime, which would allow start-ups to prove concept and attract additional investment

X INVENTORY OF LOCAL PROVIDERS

As part of our work, we created an Excel-based inventory of local capital providers across the debt, equity, and grant landscapes

#	Name:	Size of Investment (\$ Amount):	Eligible Uses of Investment (if applicable):	Investment Term (Length in Months or Years):	Financial return expectation / Interest Rate:	Underwriting criteria (Credit score, Collateral):
1	Craft3	Usually \$25K - \$3M, but can be smaller or larger on case-by-case basis if USDA Loan Guarantee is utilized	Start-up or Acquisition; Working Capital; Equipment; Commercial Real Estate; Debt Restructuring; Project Financing	3 to 7 years (longer amortizations possible)	7 to 12% interest rate; 2% fees + closing costs	"We offer both secured and unsecured loans. In many cases, we will require a personal guarantee from you or a guarantor. For some loans, Craft3 may opt to utilize the USDA Business & Industry and SBA Community Advantage loan guarantee programs."
		Usually \$25K - \$3M, but can be smaller or larger on case-by-case basis if USDA Loan Guarantee is utilized	Start-up or Acquisition; Working Capital; Equipment; Commercial Real Estate; Debt Restructuring; Project Financing	3 to 7 years (longer amortizations possible)	7 to 12% interest rate; 2% fees + closing costs	
2	Business Impact NW	\$5K to \$350K; median loan is \$49K	Startup capital for businesses in operation under 6 months; working capital for businesses in operation under 2 years; growth management and debt restructuring for established businesses in operation for 2+ years	1 to 7 years	Not specified	Some form of business or personal collateral or guarantee (flexible)
3	Wells Fargo	\$10K to \$100K	"Great for: Large one-time expenses, business expansion, facility remodels, emergency repairs"	1 to 5 years	Fixed rates starting at 8% interest	
		\$10K to \$35K	"Great for: Large one-time expenses, business expansion, facility remodels, emergency repairs"	1 year	Interest rates starting at 13.99%	
		\$100K to \$500K	"Great for: Business improvements, business expansion, large purchases"	Up to 1 year draw; balance converts to loan	Interest rate not specified; origination fee of 0.50% of line amount	Secured by business assets (non real estate) - e.g., AR, inventory, equipment, or cash
		\$10K to \$100K	"Great for: Buying used or new vehicles - including trucks and trailers, upgrading equipment"	2 to 6 years	Fixed rates starting at 6.75% for vehicle loans and 7.25% for equipment	Collateral in the form of equipment
		\$5K to \$50K (revolving)	"Great for: Supplementing cash flow, expanding business, covering unexpected expenses"	5 year revolving line of credit	Interest rates as low as prime + 1.75%; annual fees	Personal guarantees required from each owner with 20%+ stake in business
\$5K to \$100K (revolving)	"Great for: Establishing or re-building business credit, supplementing cash flow, funding new opportunities"	Revolving line of credit with no scheduled annual review	Interest rates as low as prime + 1%	Secured by Wells Fargo savings or CD account		

Information documented includes (where available):

- > Location of Institution
- > Organization Type (e.g., CDFI, Commercial bank, Foundation, etc.)
- > Type(s) of capital provided
- > Other services provided (e.g., technical assistance)
- > Products
- > Target business size / stage
- > Typical investment size
- > Eligible uses of investment
- > Investment terms
- > Financial return expectations
- > Underwriting criteria (e.g., collateral requirements)
- > Industry focus
- > Geographic focus

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X WHAT IS A “DEAL”?

- > For purposes of this engagement, we are defining a “deal” as a potential investment in an enterprise (direct to small business), project, or intermediary
- > We have identified 10 deals across four key categories with diverse capital sources required, ranging from corporate investment to public-private partnerships

Public Infrastructure

Investments in large scale projects to build or rebuild key maritime infrastructure (e.g., ports) that will enable small businesses to operate more effectively and / or have direct impacts on environmental sustainability within the Maritime industry

Commercial Core Maritime

Investments in Maritime-based small businesses that fall into “core” maritime segments (e.g., ship and boat building, repair and maintenance, commercial fishing and seafood products, passenger water transport, maritime logistics & shipping, and recreational boating and boat building)

Maritime Technology

Investments in Maritime-based small businesses that have technology applications (e.g., robotics, sensors)

Change Drivers

Investments in funds or projects that aim to increase inclusivity and / or innovation within the Maritime sector

X SUMMARY OF ILLUSTRATIVE DEALS

We have identified 10 illustrative capital deals to support the development and expansion of Washington's Blue Economy

★ Opportunity prioritized by Maritime Blue Steering Committee in July 30th working session

Type of Deal	#	Deal	Detail
Public Infra-structure	1	★ Electrification of ferries	> Investment in the retrofit of 2 existing ferries, commission 5 new hybrid power ferries, and create and install shore power
	2	★ Port rebuilding in rural communities	> Investment to rebuild aging critical port infrastructure (e.g., breakwaters, docks) in rural communities
Commercial Core Maritime	3	Increasing small vessel loans	> Investment in small fishing vessels by catalyzing loans between \$500k - \$1m
	4	Transitioning to low emission marine engines	> De-risk investment in small business to convert vessel engines into environmentally sustainable engines
	5	★ Funding MER Equipment	> Direct investment in MER Equipment to support R&D into more sustainable energy solutions
Maritime Tech	6	★ Funding Numurus	> Direct investment in Numurus to commercialize technology and demonstrate applications in industries other than Maritime
	7	★ Funding Olis Robotics	> Direct investment in Olis Robotics to enable them to develop software for land-based industrial robots and fund their development for the next 5 years
	8	Support for robotics and automation technology for shipbuilding	> Catalyze innovation in robotics and automation for shipping companies by developing a research lab
Change Drivers	9	Establishing loan loss reserve fund for CDFIs	> Investment in a loan loss reserve fund that de-risks financing from CDFIs into businesses owned by women and people of color
	10	★ Setting up innovation contracts	> Investment to de-risk partnerships between small businesses and large corporations to promote innovation



PUBLIC INFRASTRUCTURE

X ILLUSTRATIVE DEAL: ELECTRIFICATION OF FERRIES (1 OF 3)

Overview of Deal Opportunity

- > Retrofitting 2 existing ferries with electric power
- > Commissioning 5 new hybrid-power ferries
- > Creation and installation of a shore power system able to charge ferries in 15 minutes

Key Details

Capital Type	> Hybrid – potential mix includes state funding, corporate or private investment, and impact philanthropy
Investment Size	> \$500M or more
Expected Return	> Depends on funding model pursued, see next slide for additional detail
Capital Stack Components	> Capital stack may include public funds, government bonds, debt, and revenue-based investment
Potential Funders	> State of Washington, The Port of Seattle, Vigor, DNV GL; may also include additional corporate investors who are interested helping to develop shore power (e.g., Cochran Marine)

Value Proposition

For Investors

- > This is a major infrastructure initiative for a key piece of Washington’s maritime economy; substantial cost savings on fuel and repair vs. diesel-burning ferries could lead to strong return on investment

For SMBs

- > Opportunity to be a part of key infrastructure project(s) for Washington State, which will enhance notoriety and revenue streams from contracts
- > Position SMB for additional business via related projects

For Maritime Blue

- > Electrification of the ferry system will significantly reduce reliance on diesel fuel and lead to a commensurate reduction in carbon emissions

X ILLUSTRATIVE DEAL: ELECTRIFICATION OF FERRIES (2 OF 3)

Deal Structure

Funding Structure	Details	Capital Flows
Pay for Success (PFS) model	<ul style="list-style-type: none"> > Via this model, a share of the savings realized over diesel-burning ferries (see Denmark example below) would be returned to investors and industry partners (for both ferry construction and shore power installation) to provide financial return > Additional opportunity, already discussed, for the state to issue bonds coming from fuel savings for additional revenue 	
Public-private partnership (P3)	<ul style="list-style-type: none"> > Through the P3, retrofitting and construction could begin, paid for with apportioned state funds (transportation budget, VW mitigation funds) – a shipbuilder, Vigor, has a contract to retrofit current boats and build new electric ones > Funds may also be used to help subsidize the installation of a suitable shore power system, developed through a joint industry effort > Private investment and corporates would be paid returns through a portion of port fees collected > This has thus far proven politically unviable due to legislative resistance to using public funds for private payments 	

Case Examples

Electrification of Denmark's Ferries:

- > A Siemens study from 2016 concluded that 7 of 10 ferries converted to all-electric or hybrid power would be more profitable
- > Savings would be generated through reduced maintenance costs, stabilized costs of electric power vs. volatility of fossil fuels, and lighter, more efficiently-operating ship
- > In 2018 and 2019, Denmark commissioned all-electric ferries, paid for through a €94B EU scientific research fund

Shore Power at Port of San Diego

- > \$11.4m invested (via Capital Improvements Program, funded by Port revenues) by the Port, to install 2 systems, with an additional \$2.4M provided via state grants from the Carl Moyer air quality improvement program

X ILLUSTRATIVE DEAL EXAMPLE: *ELECTRIFICATION OF FERRIES (3 OF 3)*

Due Diligence Questions / Follow-Up

- > What are the potential new legislative paths that can avoid the previous resistance?
- > What role can the state and the identified shipbuilder (Vigor) play in putting together a potential joint industry deal to build out the remaining ferries and develop a suitable shore power system?
- > What would be estimated returns of the Pay for Success model be? How much data is there to model the cost savings of the electric ferries for PFS investors?

X ILLUSTRATIVE DEAL: PORT REBUILDS IN RURAL COMMUNITIES (1 OF 3)

Overview of Deal Opportunity

- > Rebuild aging critical port infrastructure (e.g., breakwaters, docks) in rural communities to support Maritime-based small businesses

Deal Structure

Funding Structure	Details	Capital Flows
<p>Public-private partnership (P3)</p>	<ul style="list-style-type: none"> > Given that rural port infrastructure is often an undercapitalized public good, public-private partnerships (P3s) could be promising solutions > Under a P3, both the public authority (e.g., port authority, municipal or state government) and a private company (e.g., construction company) would invest funds into the port construction project > The port would remain under public ownership, but would be leased to the private company under a long-term contract (~40 years) > The private company would operate the port, charge fees, and return some of that revenue to the public authority in the form of rent > As an additional incentive to the private player, the contract may allow the company to develop additional revenue-generating operations in the port (e.g., concessions, rentals, etc.) > A critical key to success is ensuring sufficient public funding <ul style="list-style-type: none"> – Past attempts at P3s (e.g., 2011 assessment of potential P3 for Anacortes ferry terminal) failed to launch due to insufficient state funds, despite multiple interested private companies > Federal grants could help fill shortfalls in state funding <ul style="list-style-type: none"> – DOT BUILD Grants provide \$1M-25M for infrastructure (including in ports) in rural areas – US Fish & Wildlife Service Boating Infrastructure Grants (BIG) provide up to \$200K/year for port/marina infrastructure serving transient vessels 	<p>The diagram illustrates the capital flows in a public-private partnership for port reconstruction. It features five main components: 'Other Gov (e.g., fed)', 'Public Authority', 'Private Company', 'Port Rebuild', and 'Operations'. 1. A yellow arrow labeled '1' shows both the Public Authority and the Private Company contributing to the 'Port Rebuild' phase. 2. A dashed yellow arrow labeled '2' shows 'Other Gov' providing grants to the Public Authority. 3. A red arrow labeled '3' shows revenue flowing from 'Operations' back to the Private Company. 4. A red arrow labeled '4' shows the Private Company paying a lease fee to the Public Authority, which retains ownership of the infrastructure. A legend at the bottom right explains each numbered step: <ol style="list-style-type: none"> Public authority and private company contribute to cost of construction project There may be other grants (e.g., from federal agencies) to reduce the burden on local/state government and the private partner(s) The private company receives revenue from the operation of the port infrastructure The private company pays lease to the public authority that retains ownership of the port infrastructure </p>

X ILLUSTRATIVE DEAL: PORT REBUILDS IN RURAL COMMUNITIES (2 OF 3)

Case Examples

Sampson & Seneca Lake State Parks, NY

- > Project: Rehabilitation of aging marinas in 2 state parks & investments in camping grounds
- > Total Cost: \$7.5M total (\$4M for marinas)
- > Deal Structure: A local, family-owned business (SamSen) was awarded a 40-year lease contract to manage improvements to and operation of marinas; the contract involved the option to develop and operate other revenue-generating businesses at the park (e.g., cabin rentals, RV campground)
- > Funding: \$2M in state parks funding (from State of NY), \$1.5M investment commitment from SamSen; funding for additional amenities was through a regional EDC and a grant through a state senator

Key Details

Capital Type	> Mix of public grants and direct private investment in project
Investment Size	> Other rural port/marina projects suggest rough order of magnitude cost of \$4M per project
Expected Return	> Depends on port revenue and terms of lease agreement
Potential Funders	State of WA, federal grants (e.g., DOT, USWFS), private construction companies

Value Proposition

For Investors (private companies)	> Long-term and exclusive revenue stream, opportunity to develop additional revenue-generating operations at port
For SMBs	> Access to functional, modern infrastructure that otherwise may not have been rebuilt
For Maritime Blue	> Promoting continued viability of rural maritime communities

X ILLUSTRATIVE DEAL: *PORT REBUILDS IN RURAL COMMUNITIES (3 OF 3)*

Due Diligence Questions / Follow-Up

- > What rural communities might be particularly amenable to P3s for port infrastructure?
- > Are there any companies that could be especially strong private partners?
- > How much revenue (and what level of rent) would a project have to include to be enticing to private businesses?
- > Where could the State of WA locate funding in its state budget to support P3s? How much funding could it make available?



COMMERCIAL CORE MARITIME

X ILLUSTRATIVE DEAL: INCREASING SMALL VESSEL LOANS (1 OF 3)

Overview of Deal Opportunity

- > Capital provider interviews revealed a gap in loan availability for small maritime businesses looking for \$500K-\$1M (e.g., for small fishing vessels) from either small lenders (e.g., CDFIs) or banks
- > There is an opportunity to incentivize banks to make smaller dollar loans to small businesses looking to refurbish or build their fishing fleet(s)

Deal Structure

Funding Structure	Details	Capital Flows
<p>Movement of State Deposits as Incentives</p>	<ul style="list-style-type: none"> > To fill this gap, the State of WA needs to incentivize lenders to make smaller loans to small businesses; this is not just a matter of risk – it is also a matter of capital availability and returns > One low-risk incentive the State of WA could offer lenders is an increase in state treasury deposits the lenders receive, which would be proportional to the volume of loans they make in the target range / to target business types <ul style="list-style-type: none"> – The State of WA would designate a certain amount of treasury funds that it will deposit at participating lenders – For every qualifying loan that a lender makes, it would receive a state deposit of equivalent value – For types of loans that the State particularly wants to incentivize, the matching rate could be more attractive (e.g., 2:1 state deposit-to-loan value) > This approach could be feasible and generate widespread interest in WA due to the high number of lending institutions already authorized to receive state deposits (and, therefore, eligible for such a program) <ul style="list-style-type: none"> – There are 64 banks and 15 credit unions in WA that are authorized to accept public deposits > Such a program has the advantage of not requiring additional funding, as it simply shifts existing treasury deposits 	<p>The diagram illustrates the capital flows in the deal structure. It features four main components: Lenders (represented by a stack of blue boxes), State (a blue box), Small Businesses (a blue box), and a Broader pool of borrowers (a blue box). The flows are numbered 1 through 4:</p> <ul style="list-style-type: none"> 1: Lenders make qualifying loans to small businesses (indicated by a red arrow from Lenders to Small Businesses). 2: The State of WA makes deposits in lenders in proportion to their qualifying loans (indicated by a red arrow from State to Lenders). 3: New deposits enable lenders to increase their overall lending (indicated by a red arrow from State to Lenders, and a red arrow from Lenders to the Broader pool of borrowers). 4: Lenders receive interest payments on their loans (indicated by red arrows from Small Businesses and the Broader pool of borrowers back to Lenders).

X ILLUSTRATIVE DEAL: INCREASING SMALL VESSEL LOANS (2 OF 3)

Case Examples

State of Rhode Island's BankLOCAL Program

- > Deal Structure: RI State Treasury initiative launched in 2017 that designated \$30M in state deposits that can be shifted to lenders that make loans to small businesses; there is a 2:1 state deposit-to-loan value ratio for loans to person of color-owned, women-owned, and veteran-owned small businesses
- > Total Cost: N/A (shifting existing deposits)
- > Funding: Existing state treasury funds

Key Details

Capital Type	> State treasury deposits
Investment Size	> Flexible; depends on how many funds the state treasury is willing to designate as subject to the program
Expected Return	> N/A (moving existing state deposits across pre-approved financial institutions)
Potential Funders	State of WA

Value Proposition

<i>For State of WA</i>	> Little to no additional investment required (shifting existing funds), low risk (not investing directly in small businesses), does not violate constitutional prohibitions on investing public funds in private enterprise
<i>For Lenders</i>	> Increase in deposits allows lenders to increase their lending by an even greater amount, thereby increasing their revenue
<i>For Maritime Blue</i>	> Increasing loans to small maritime businesses that otherwise struggle to obtain capital

ILLUSTRATIVE DEAL: *INCREASING SMALL VESSEL LOANS (3 OF 3)*

Due Diligence Questions / Follow-Up

- > How many treasury funds would the State of WA be willing to designate as movable through this program?
- > What parameters would the State of WA want to put on “qualifying loans” (e.g., loan size, industry sub-sector, etc.)?
- > If loan size is a parameter, could there be an adverse consequence of incentivizing banks to push borrowers to take out loans for more or less than they really need?
- > What other opportunities exist to fill the gap of capital from \$500k - \$1m (e.g., CDFIs funding larger size loans or giving borrowers a cut of interest rates if they undergo an innovation audit)?

X ILLUSTRATIVE DEAL: LOW-EMISSION MARINE ENGINES (1 OF 3)

Overview of Deal Opportunity

- > The Maritime Blue Strategy aims to make shipping more sustainable by reducing its carbon footprint, but even businesses interested in making their vessels more environmentally friendly may lack funds to invest in new, low-emission marine engines
- > Through this deal, the State can leverage tax credits for small businesses to convert their engines

Deal Structure

Funding Structure	Details	Capital Flows
<p>Tax Credits</p>	<ul style="list-style-type: none"> > The State of WA's constitutional prohibition on investing public funds in private enterprise likely precludes direct subsidies of small business owners' purchase of low-emission engines > However, tax credits for retrofitting vessels with low-emission engines or including low-emission engines in new-builds could be a viable work-around > The State of WA could add eligibility requirements that would generate additional economic benefit for the state and ensure that the state captures environmental benefit <ul style="list-style-type: none"> – Potential eligibility requirements include: <ul style="list-style-type: none"> • Retrofits or new-builds must be done in WA, thereby supporting WA shipyards and maritime jobs • Vessels must operate a certain percentage of the time in WA waters or demonstrate that a certain minimum portion of their emission reductions accrues in WA (this may be challenging, though, given that fishing vessels often have to operate outside of WA waters in order for their businesses to be financially viable) > This program would build on existing efforts by the Puget Sound Clean Air Agency, which has historically leveraged several funding/federal grant sources to finance clean marine engines (most recently, an EPA grant to replace engines on 6-8 harbor vessels) 	<p>The diagram illustrates the capital flows between three entities: the State, Vessel owners, and Engine sellers, retrofitters, shipyards. The flows are numbered 1 through 4:</p> <ol style="list-style-type: none"> Vessel owners purchase new low-emission engines to retrofit existing vessels or to be installed in new-builds. State grants tax credit to vessel owners. Tax revenue from companies that install the engines and from WA jobs supported/retained. Tax revenue generated from vessel operations in WA.

X ILLUSTRATIVE DEAL: LOW-EMISSION MARINE ENGINES (2 OF 3)

Case Examples

State of CA's Carl Moyer Program: Marine Vessels

- > Project: State of CA Air Resources Board engine replacement subsidy program administered through local air pollution control districts, which shape eligibility requirements for their areas; the program is focused on incentivizing vessel owners to upgrade engines to exceed legal requirements for emissions
- > Total Cost: Avg. \$71.K/engine (1998-2017)
- > Deal Structure: Depending on type of engine upgrade, program will cover up to 85% of the cost of low-emission engines for various types of vessels (e.g., fishing, tugboat, ferry, barge, etc.); some air pollution control districts (e.g., Santa Barbara County) require vessels to operate 100% of the time in their coastal waters, ensuring they capture environmental and economic benefits

Key Details

Capital Type	> N/A (tax credit)
Investment Size	> Flexible; depends on what percentage of costs the State of WA is willing to cover through tax credits
Expected Return	> N/A
Potential Funders	State of WA

Value Proposition

For State of WA	> Incentivize maritime economic activity in the State of WA (e.g., shipbuilding, retrofitting)
For Maritime Blue	> Increasing loans to small maritime businesses that otherwise struggle to obtain capital

ILLUSTRATIVE DEAL: LOW-EMISSION MARINE ENGINES (3 OF 3)

Due Diligence Questions / Follow-Up

- > How much of the engine cost should be recoverable via a tax credit to incentivize businesses to invest in new, low-emission engines?
- > What data is available to model the revenue offset for the tax credit from local production?
- > What eligibility requirements would the State of WA want to put on these incentives?

X ILLUSTRATIVE DEAL: MER EQUIPMENT (1 OF 2)

Overview of Deal Opportunity

Company

- > MER Equipment is a marine equipment supplier primarily focused on power generation, distribution, and management, primarily supporting the fishing and tugboat industries in the Pacific Northwest
- > MER Equipment was founded in 1964 by a fisherman, Ivan Fox, and is now in its 3rd generation of leadership

Investment

- > MER Equipment is branching into R&D for more sustainable energy solutions (e.g., hybrid power; this investment would allow them to commit to that R&D more fully without threatening cash flow)

Key Details

Capital Type	> Equity preferred; other capital possible
Investment Size	> MER Equipment is seeking \$2m in equity investment
Expected Return	> Potentially 2-3x original investment
Capital Stack Components	<ul style="list-style-type: none"> > Capital stack may include equity and/or convertible notes > Revenue-based loans also possible
Potential Funders	<p>MONTLAKE CAPITAL</p> <p><i>Additional funders may include family offices and angels interested in more patient capital for SMB growth</i></p>

Value Proposition

For Investors

- > MER Equipment has a stable and successful core business and long history of doing business in the Washington maritime economy
- > The size of investment is relatively small, but has the potential to generate returns

For Maritime Blue

- > *Sustainability:* Increases sustainability through the scaling of a hybrid-power solution that can be applied to entire Fishing and tug boat fleets
- > *Economic development:* Supports the growth of a locally-owned, hardware-focused SMB with between 11-50 employees

X ILLUSTRATIVE DEAL: MER EQUIPMENT (2 OF 2)

Financial Details

Estimated revenue:

- > More than \$10M (2018)
- > Revenue is up more than 20% over the last 3 years
- > Additional details needed for investor conversations and diligence

Previous financing:

- > Have taken friends and family and personal loans over 55-year history; amounts undisclosed
- > Additional details needed for investor conversations and diligence

Relevant Trends

- > MER Equipment's interest in innovating for sustainable energy solutions in fishing, driven in part by customer demand, is part of larger worldwide trends to make the fishing supply chain more sustainable
- > While aquaculture and sustainable harvesting are well-known priority areas for sustainability, investment in MER Equipment would help create sustainable solutions further up the value chain

Case Examples

- > Quadrofoil, a Slovenian startup producing all-electric vessels for all water surfaces, **completed a €3M Series A in 2018** led by Swiss investor AlpVent; funds will be used to expand manufacturing capacity and quickly scale sales and marketing
- > Pure Watercraft, a Seattle-based electric propulsion company designing and **building electric powered recreational watercraft, raised \$2.1M in debt financing in 2016** (details on funders and specific uses are unknown, but interviews with the founder from that time indicate the money was used to product prototypes that would attract venture investors)

Due Diligence Questions / Follow-Up

- > Typical VC due diligence



MARITIME TECHNOLOGY

X ILLUSTRATIVE DEAL: NUMURUS (1 OF 2)



Overview of Deal Opportunity

Company

- > Numurus, founded in 2017 by a team of robotics engineers, offers Internet of Things products and services focused on data processing, robotics, and fleet inspection solutions; these offerings have a wide variety of maritime applications that support smarter, more sustainable use of resources and energy

Investment

- > With this growth investment, Numurus will commercialize their technology to demonstrate applications in industries other than maritime and attract additional future investment

Key Details

Capital Type	> Equity preferred, other capital possible
Investment Size	> Numurus is seeking \$2M in equity investment
Expected Return	> Potentially 2-3x original investment
Capital Stack Components	<ul style="list-style-type: none"> > Capital stack may include equity and/or convertible notes > Revenue-based loans also possible
Potential Funders	<p>MONTLAKE CAPITAL</p> <p><i>Additional funders may include family offices and angels interested in more patient capital for SMB growth</i></p>

Value Proposition

For Investors

- > IoT applications in maritime sectors are part of a larger technological trend for smart, more sustainable maritime operation and systems
- > Globally, there is increased demand for IoT solutions across a variety of industries; investment in Numurus would help them demonstrate these varied applications and expand returns

For Maritime Blue

- > *Sustainability:* Reduces energy consumption through application of smarter fleet management tools
- > *Economic development:* This investment will help commercialize leading technology from a local maritime SMB

X ILLUSTRATIVE DEAL: NUMURUS (2 OF 2)



Deal Structure

Estimated revenue:

- > Between \$500,000 and \$1m (2018)
- > Revenue is up more than 20% over the last 3 years
- > Government product and service contracts are roughly 80% of revenue; remaining 20% is additional product sales
- > Additional details needed for investor conversations and diligence

Previous financing:

- > \$250,000 equity investment for working capital and R&D (2018)
- > \$150,000 line of credit established for R&D funding (2018)

Due Diligence Questions / Follow-Up

- > Typical VC due diligence

Relevant Trends

- > In 2017, venture capital funding into U.S.-based IoT startups was \$1.4B, up 216% from the \$461.7 million raised in 2013
- > An Inmarsat study from 2018 found that adoption of and spending on IoT in maritime sectors exceeds that of other industries as maritime stakeholders focus on energy efficiencies and cost reduction

Case Examples

- > Traxens, a French supply chain data company, **closed a €20M Series C round** (led by investment bank Bpifrance) that will allow them to launch **a global large-scale sea-land fleet of IoT tracking solutions**
- > In response to global trends in IoT adoption, **in 2018, British telecom company Inmarsat launched Fleet Data**, which will enable ship owners and managers to access and analyze real-time onboard data

X ILLUSTRATIVE DEAL: OLIS ROBOTICS (1 OF 2)

Overview of Deal Opportunity

Company

- > Olis's robotics platform and machine learning software supports robotic dexterity, precision, and efficiency to reduce downtime and costs
- > Olis's CEO, Don Pickering, is a successful serial entrepreneur in both the maritime and technology space. Mostly recently, in 2010, he launched OneOcean (now ClipCard) dedicated to cloud software and data exchanges for sea floor data, raising \$8M for the company

Investment

- > Olis is moving into development of software for land-based industrial robots; this Series A will help fund that development and support growth for the next 5 years

Key Details

Capital Type	> Equity
Investment Size	> Olis is raising a \$12M Series A-I
Expected Return	> Olis is targeting a \$500M exit – estimated timeline is at least another 5 years
Capital Stack Components	> Capital stack may include equity and/or convertible notes
Potential Funders	

Value Proposition

For Investors

- > Olis has already gone through several rounds of diligence, raising (in previous rounds) \$3.6M in grant capital, including \$770k from the National Science Foundation, with an additional \$1.5M in matching capital from investors like Alliance of Angels and SeaChange fund
- > Olis is targeting a broad customer base in a wide variety of industries, creating opportunity for multiple revenue streams

For Maritime Blue

- > *Sustainability and Research:* Olis's autonomy software for remote robotic systems has a wide range of applications in subsea research and navigation

X ILLUSTRATIVE DEAL: OLIS ROBOTICS (2 OF 2)

Deal Structure

Estimated revenue:

- > Between \$500,000 and \$1m (2018)
- > Revenue is up more than 20% over the last 3 years
- > Additional details needed for investor conversations and diligence

Previous financing:

- > \$3.6M in grant capital raised between 2016 and 2018
- > \$1.4M Series A raised in 2017
- > Venture round in 2017 (amount undisclosed)
- > Additional details needed for investor conversations and diligence

Due Diligence Questions / Follow-Up

- > Typical VC due diligence

Relevant Trends

- > Across all industries, machine learning will move from emerging technology to mainstream adoption within the next 3-5 years
- > Just as with the Internet of Things, machine learning will be a critical part of the Blue Economy as maritime sector stakeholders look for energy and cost efficiencies

Case Examples

- > San Diego's Ocean Aero, which designs unmanned vehicles that operate both on the ocean surface and underwater, **closed a Series B in 2018 and has several corporate investors**, including Teledyne and Lockheed Martin
- > Boston based **Sea Machines Robotics closed a \$10m Series A round in 2018 led by Cambridge-based Accomplice Capital** with participation from Eniac Ventures

X ILLUSTRATIVE DEAL: R&D GRANTS FOR SHIPPING TECHNOLOGY (1 OF 3)

Overview of Deal Opportunity

- > The idea of support for R&D was frequently raised in conversations with investors, who are looking for maritime tech that can move beyond proof of concept and generate revenue
- > SMB owners in focus groups also articulated the need for more R&D funding that is not specifically tied to customer orders
- > Financial and operational support for shipping technology R&D could be provided through a federally- and state-funded research lab, perhaps as part of the planned maritime accelerator

Key Details

Capital Type	> Hybrid – potential mix includes federal funding, corporate or private investment, and impact philanthropy
Investment Size	> \$20M-50M fund as initial investment
Expected Return	> Limited financial return, but opportunity for valuable returns in the form of IP
Capital Stack Components	> Capital stack may include federal funds and philanthropic or corporate grants
Potential Funders	> NOAA, NSF, DOE, MARAD, relevant corporates (DNV GL, Teledyne, Lockheed), various philanthropic investors focused on science and innovation (e.g., Lemelson, Packard, others)

Value Proposition

For Investors

- > Early-stage investment in emerging technologies and ownership of valuable Blue Economy IP; influence over application and use of technology

For SMBs

- > Opportunity to develop technology with financial and operational support from accelerator and opportunities to collaborate with corporates who are participating partners of the R&D lab

For Maritime Blue

- > Promotes innovation and small business development while attracting investment dollars and interest, demonstrating national leadership

X ILLUSTRATIVE DEAL: R&D GRANTS FOR SHIPPING TECHNOLOGY (2 OF 3)

Deal Structure

Funding Structure	Details	Capital Flows
<p>Federal grants</p>	<ul style="list-style-type: none"> > Just as DOD has provided funding for Manufacturing USA Institutes, funding for shipping technology R&D and the associated lab might be provided NOAA, NSF, DOE, MARAD or other agencies to support this > Grant funding would be provided to a maritime accelerator (idea already in concept in collaboration with WeWork Labs) to provide technical assistance and capital to small businesses and projects working on technology relevant to research interests of these agencies 	<p>The diagram illustrates the flow of capital and information. At the top, 'Federal grants' and 'Private investment' (both in light blue boxes) are enclosed in a dashed box. Arrows labeled '1' point from these sources to 'R&D facilities at maritime accelerator' (a light blue box). From the accelerator, an arrow labeled '2' points to 'Small businesses' (a light blue box). 'Small businesses' are shown interacting with 'Corporates and industry members' (a light blue box) via bidirectional arrows. Below 'Small businesses' are two grey boxes labeled 'Innovations'. An arrow labeled '3' points from 'Innovations' back up to 'Small businesses'. A dashed red arrow labeled '4' points from 'Innovations' back to the 'Federal grants' and 'Private investment' box.</p>
<p>Private investment</p>	<ul style="list-style-type: none"> > In addition to federal grant money, angel investors, foundations (e.g., Lemelson, Packard), and other private investors interested in emerging technology could provide R&D investment for some portion of IP ownership 	<ol style="list-style-type: none"> 1 Federal grants and/or private investment are used to fund R&D grants through the maritime accelerator 2 The maritime accelerator accepts innovative SMBs with R&D goals that can support Maritime Blue 3 SMBs develop their innovations, with corporates and industry members typically helping to run projects; SMBs go to market with innovations 4 IP and/or a portion of revenues from innovative products or services are returned on investment and fund additional grants

Case Examples

MxD (formerly UI Labs)

- > Established in 2015 as a digital manufacturing program and applied research lab through an initial \$70M grant, and ongoing grants of \$50M from the Department of Defense
- > DOD supports digital labs and testing for development of new supply chain systems, with priority on relevant IP developed through use of MxD's labs, manufacturing workflow, and demonstration spaces
- > MxD has also attracted more than 300 partners across 35 states, including Dow Chemical, Lockheed Martin, and Siemens; these corporate clients provide technical and operational assistance to projects at MxD and support development of new technologies; corporates pay for participation, generating additional revenue

Innovation and R&D grants from Innovation Norway

- > Innovation Contracts, detailed on slide 42-44, are a key pipeline for Innovation Norway's R&D grants, as two parties (frequently a corporate and a SMB) may receive R&D funding to develop a solution to a technological problem if a current solution does not exist

X ILLUSTRATIVE DEAL: R&D GRANTS FOR SHIPPING TECHNOLOGY (3 OF 3)

Due Diligence Questions / Follow-Up

- > What would be the specific mechanics and terms of IP ownership?
- > How would SMBs be evaluated for eligibility/fit based on their product developments and fit for the accelerator/R&D grants?
- > How would R&D funding be kept separate from other accelerator funding?
- > How would governance be established to allocate federal dollars to priority industry projects?



CHANGE DRIVERS

X ILLUSTRATIVE DEAL: LOAN LOSS RESERVE FUND (1 OF 2)

Overview of Deal Opportunity

- > Create / catalyze loan loss reserve fund to incentivize local CDFIs (e.g., Craft3, NDC, Business Impact NW) to fund more maritime-based businesses owned by women, native communities, and people of color

Deal Structure

Funding Structure	Details	Capital Flows
<p>Grants to Loan Loss Reserve Fund</p>	<ul style="list-style-type: none"> > The State of WA and/or philanthropic organizations could set aside a pool of funds to cover a percentage of defaulted loans made by CDFIs or other entities that traditionally lend to underserved populations; this would serve to de-risk investments to perceived “riskier” borrowers (e.g., women or people of color) and make lenders more willing to expand their lending <ul style="list-style-type: none"> – Examples of foundations the State of WA could approach as potential partners include Lemelson, Packard, Russell Family Foundation – While these foundations do not appear to have a history of investing in the maritime sector beyond education and environmental clean-up, a loan-loss reserve fund focused on underserved communities could be a strong, mission-centered opportunity to expand their engagement in the maritime sector > The total cost to cover losses up to 5% of total portfolio value for the above-mentioned lenders (i.e., Craft3, NDC, Business Impact NW) would be \$6.5M > Launching the LLR would require identifying and establishing agreements with CDFIs or other local lenders that have strong ties to native communities, communities of color, and women entrepreneurs (e.g., Craft3, Business Impact NW, Certified Native CDFIs like the Lummi CDFI in Bellingham, etc.) 	<p>The diagram illustrates the capital flows in the deal structure. It features five main components: Lenders (represented by a stack of blue boxes), State (a blue box), Foundations (a blue box), Small businesses (a blue box), and LLR (Loan Loss Reserve, a grey box). 1. Lenders make loans to small businesses (indicated by a solid arrow from Lenders to Small businesses). 2. State and/or foundations make deposits to loan loss reserve (indicated by solid arrows from State and Foundations to LLR). 3. In some programs, lenders and borrowers may also make deposits to the LLR (a small % of loan size) (indicated by a dashed arrow from Small businesses to LLR). 4. In the event of losses, lenders can draw up to a set % of their losses from the LLR (indicated by a solid arrow from LLR back to Lenders).</p> <ol style="list-style-type: none"> Lenders make loans to small businesses State and/or foundations make deposits to loan loss reserve In some programs, lenders and borrowers may also make deposits to the LLR (a small % of loan size) In the event of losses, lenders can draw up to a set % of their losses from the LLR

X ILLUSTRATIVE DEAL: LOAN LOSS RESERVE FUND (2 OF 2)

Case Examples

California Capital Access Program for Small Businesses (CalCAP)

- > Project: A loan loss reserve fund administered by the State of CA's Pollution Control Financing Authority (CPCFA) that de-risks small business loans and supports environmental sustainability
- > Total Cost: Variable with loan volume and amount; in 2018, CalCAP lenders enrolled \$377.6M of loans and paid roughly \$16.9M (about 4.5% of the enrolled amount) from the loan loss reserve fund
- > Deal Structure: Any eligible lender (e.g., CDFI, bank, credit union) in CA that makes loans to CA-based small businesses (<100 employees) can enroll their loans in the CalCAP program; when a loan is enrolled, CPCFA makes a deposit into a loss reserve account for the lender, and – for some loans – lenders and borrowers also contribute a small percentage (2-3.5%) of the loan value to the fund; in the event of default on the loan, the loss reserve fund will cover up to 100% of the lender's losses

Key Details

Capital Type	> Grants
Investment Size	> ~\$6.5M
Expected Return	> N/A
Potential Funders	State of WA; foundations

Value Proposition

For State /
Philanthropic
Contributors
and
Maritime
Blue

- > Support and help grow currently underrepresented demographics in the maritime sector

Due Diligence Questions / Follow-Up

- > Which foundations or family offices would be willing to contribute to the loan loss reserve?

X ILLUSTRATIVE DEAL: INNOVATION CONTRACTS (1 OF 3)

Overview of Deal Opportunity

- > Through Innovation Contracts, Washington State would provide financial incentives that would encourage innovation and cooperation between large corporates and smaller, innovative maritime businesses by providing funding to help subsidize the development of new maritime technology

Key Details

Capital Type	> Hybrid – potential mix of state grants and loans (pass throughs of federal grants) and philanthropic impact capital
Investment Size	> \$5-10M pilot, with opportunity to scale
Expected Return	> 3%-5% return on loans issued as part of Innovation Contract funding
Capital Stack Components	> Grants, loans
Potential Funders	> State of Washington, various philanthropic investors focused on science and innovation (e.g., Lemelson, Packard, others)

Value Proposition

For Investors

- > Opportunity to fund potentially disruptive and high-growth innovation in the maritime economy
- > For the state, this is an opportunity to spur innovation and economic development, positioning Washington as a leader in Blue Economy innovation

For SMBs

- > Reduces development costs for innovation projects with larger corporate customers, giving exposure to larger customer base and sales channels

For Maritime Blue

- > Promotes innovation and small business development within the Blue Economy

ILLUSTRATIVE DEAL: INNOVATION CONTRACTS (2 OF 3)

Deal Structure

Funding Structure	Details	Capital Flows
<p>Federal and state funding</p>	<ul style="list-style-type: none"> > Financial returns (\$4M to \$7M) from previous clean energy fund, a federal-funds pass-through program, could be invested back into this pilot > To ensure continued solvency of the program, Washington State could provide Innovation Contract funding as both a low-interest loan in addition to grant funding > Financial benefits could potentially mirror those in Norway (see below): in a partnership between corporate and innovative SMB, larger corporate would be responsible for at least 20% of overall development costs; grants and loans would be issued to SMB to cover up to 45% of its development costs 	
<p>Philanthropic impact capital</p>	<ul style="list-style-type: none"> > Foundations would fund Innovation Contracts through impact investment in the form of grants and low-interest loans that offset a portion of the development costs incurred by SMBs > In this funding structure, the partnerships of corporates and SMB seeking an Innovation Contract would either apply for funding directly from the foundation, or, should the foundation partner with the state, through a Washington state agency 	

- 1 Innovative project is developed
- 2 Innovation Contracts help offset costs incurred by SMB
- 3 Project launches into market and earns revenue
- 4 Returns from low-interest loans are provided back to funders

Innovation Contracts from Innovation Norway:

- > Innovation Norway, state-owned national development bank, annually spends about \$35M on Innovation Contracts, a support program that provides grants to SMBs developing new products or services to larger corporate customers
- > The pilot customer (the larger corporate) must be responsible for at least 20% of the overall development costs of the product or service
- > Importantly, the pilot customer must also have a specific and well-articulated need for a specific application of technology or innovation solution that a Norwegian SMB can provide
- > The SMB is responsible for covering at least 55% of its own costs, which are at least 80% of the overall costs but the Innovation Contract, through low-interest loans and grants, will cover up to 45%

Case Examples

X ILLUSTRATIVE DEAL: *INNOVATION CONTRACTS (3 OF 3)*

Due Diligence Questions / Follow-Up

- > What would be the process to unlock the returns (estimated as \$4m-\$7m) from the clean energy fund for use in Innovation Contract funding?
- > How would a pilot be evaluated for success? How would a determination be made on whether to continue funding, and for how much?

X OTHER CAPITAL CONSIDERATIONS: AQUACULTURE

Context

Global fish production is expected to grow by 15% (26M tons) from 2014-26, with **global aquaculture output growing by 34%** over that period*

Given the rapid growth of the industry and the State of Washington's interest in sustainably scaling fish production, **aquaculture was a subject of interest in stakeholder interviews**

To capture a piece of this growing industry, the State of WA first needs to decide which aspect(s) of the aquaculture industry it especially wants to catalyze locally

Tech Enablers

(e.g., smart fish feeding technology, robotics, reproductive technology, etc.)

Investment Type: More suited to equity than traditional aquaculture

Example Investors: Aqua-Spark (Netherlands), Alimentos Ventures (Germany)

Financing Challenges:

- Investors' lack of awareness about profitability expectations and differences in capital needs across different aquaculture sub-industries
- Perception of high risk (e.g., because industry is new, fragmented across small players, capital-intensive, has a skills shortage, and is subject to risk of disease)

Potential Actions for Further Exploration:

- Connect with existing, high-profile VCs outside of WA (e.g., those listed above) about building Pacific NW portfolios
- Develop a guide to educate other investors about capital needs, growth trends, and ways to de-risk investments in different aquaculture sub-industries

Small-Scale Aquaculture Farms

(e.g., finfish, shellfish, and sea vegetable farms)

Investment Type: Debt

Example Investors: CEI (Maine), Craft3 (Pacific NW)

Financing Challenges:

- Perception of high risk, lack of sufficient collateral, seasonality of revenue streams

Potential Actions for Further Exploration:

- Additional mapping of aquaculture capital needs and loan availability in WA to understand whether gaps in capital access identified in other places (e.g., gap in access to loans <\$150K in Maine, which is now filled by CEI's new Maine-focused Sea Farm Loan program) also apply to WA

*Source: UN Food and Agriculture Organization ("Fish projections in the OECD-FAO Agricultural Outlook: 2017-26")

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X CORE MARITIME SECTOR OVERVIEW

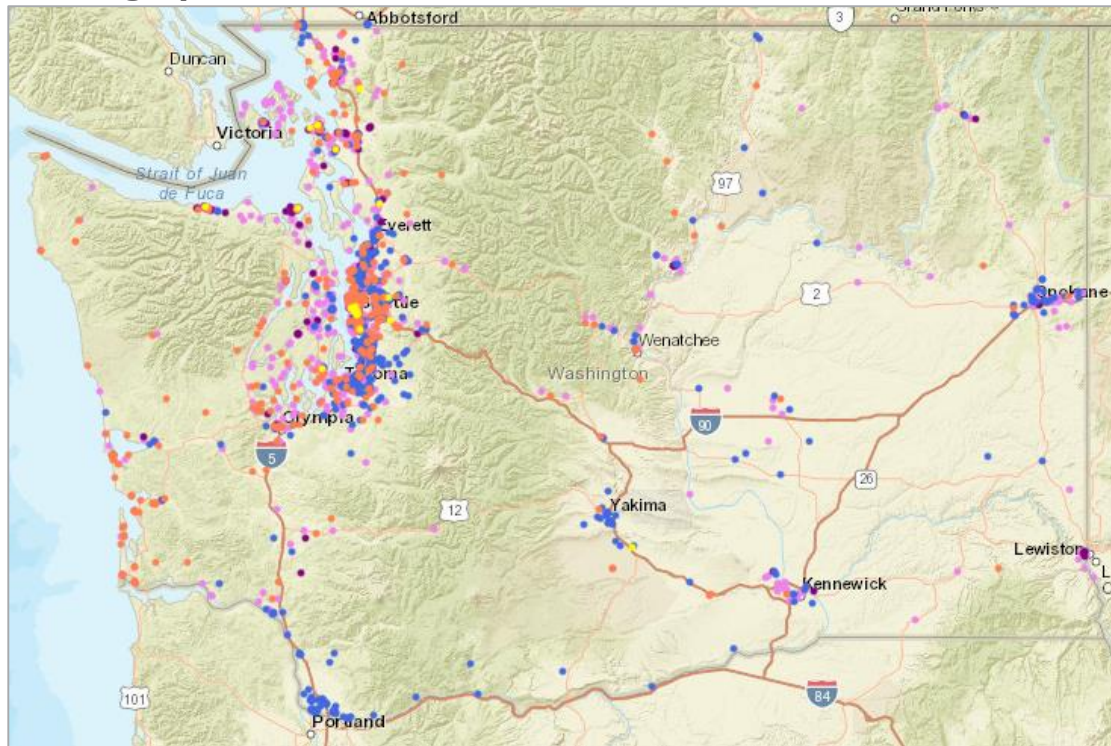
Before delving into the analysis of the core maritime sector, it is useful to understand the contents of each industry segment more deeply than NAICS codes alone allow

<u>Sub-Sector</u>	<u>Description</u>
Ship and Boat Building, Repair & Maintenance	Includes the building of cargo ships, barges, submarines, passenger ships, and drilling platforms; also includes the repair of such vessels; covers both naval and civilian vessels
Commercial Fishing & Seafood Products	Covers the full value chain of seafood production, from fishing and aquaculture related to finfish and shellfish to seafood packaging to the operation of seafood markets
Passenger Water Transportation	Includes local passenger water transportation (e.g., ferries in coastal areas, harbors, rivers, and lakes), as well as cruise ship operations
Maritime Logistics & Shipping	Includes long-distance, transoceanic, and river cargo shipping, as well as related planning, routing, and warehousing; also includes sensors, navigation systems, and other systems and instruments that contribute to safe and effective cargo / freight shipping operations
Recreational Boating & Boat Building	Includes sightseeing cruising, charter fishing boat services, and airboats; also includes the operation of marinas that provide storage, fueling, maintenance, and rental services for such boats and boating activities

X CORE MARITIME INDUSTRY DISTRIBUTION

While the Seattle-Tacoma-Bellevue MSA and broader Puget Sound region are the center of gravity for core maritime businesses, there are important secondary geographic clusters, particularly for logistics and fishing

Geographic Distribution of Small Businesses in State of WA



Analysis

- > The **Seattle-Tacoma-Bellevue MSA is the primary locus of activity** for all subsectors
- > However, Snohomish, Skagit, Whatcom, Pierce, and Kitsap counties also have a high density of maritime businesses across sectors
- > **Maritime Logistics & Shipping and Recreational Boating & Boat Building have secondary clusters** in inland cities that are located on major rivers and/or highway systems
- > **Commercial Fishing appears to be the most dispersed** segment along the coasts, with presence in areas that do not appear to have other significant clusters (e.g., Pacific County)

KEY

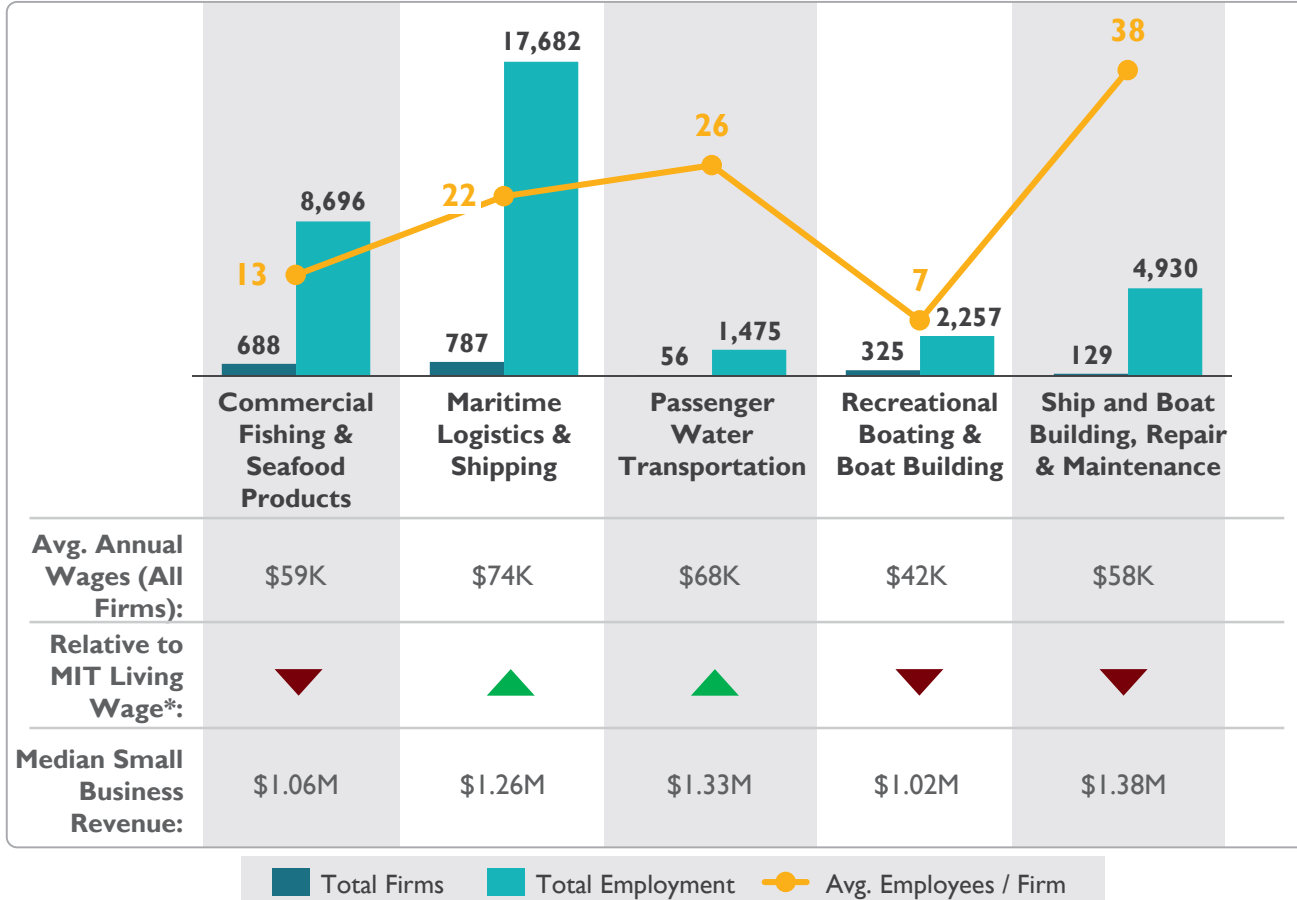
● Passenger Water Transportation	● Commercial Fishing & Seafood Products	● Maritime Logistics & Shipping
● Recreational Boating & Boat Building	● Ship and Boat Building, Repair & Maintenance	

Source: ArcGIS Business Analyst; 1 dot = one business with under 50 employees; 6-digit NAICS codes

X CORE MARITIME INDUSTRIES: FIRMS & EMPLOYMENT

Average firm size and salaries vary considerably across segments, likely due to differences in firms' labor and capital requirements and the technical skills the segments demand of employees

Firms and Employment by Industry Segment: State of WA



Analysis

- > **While Maritime Logistics & Shipping is the largest segment, Ship & Boat Building tends to have larger firms** – likely as a result of their large labor and capital requirements, relative to other segments
- > **Average salaries vary significantly (>\$30K), likely due, in part, to differences in the level of technical / specialized skills** segments require (e.g., boat dealers command lower salaries than engineers for navigational devices)

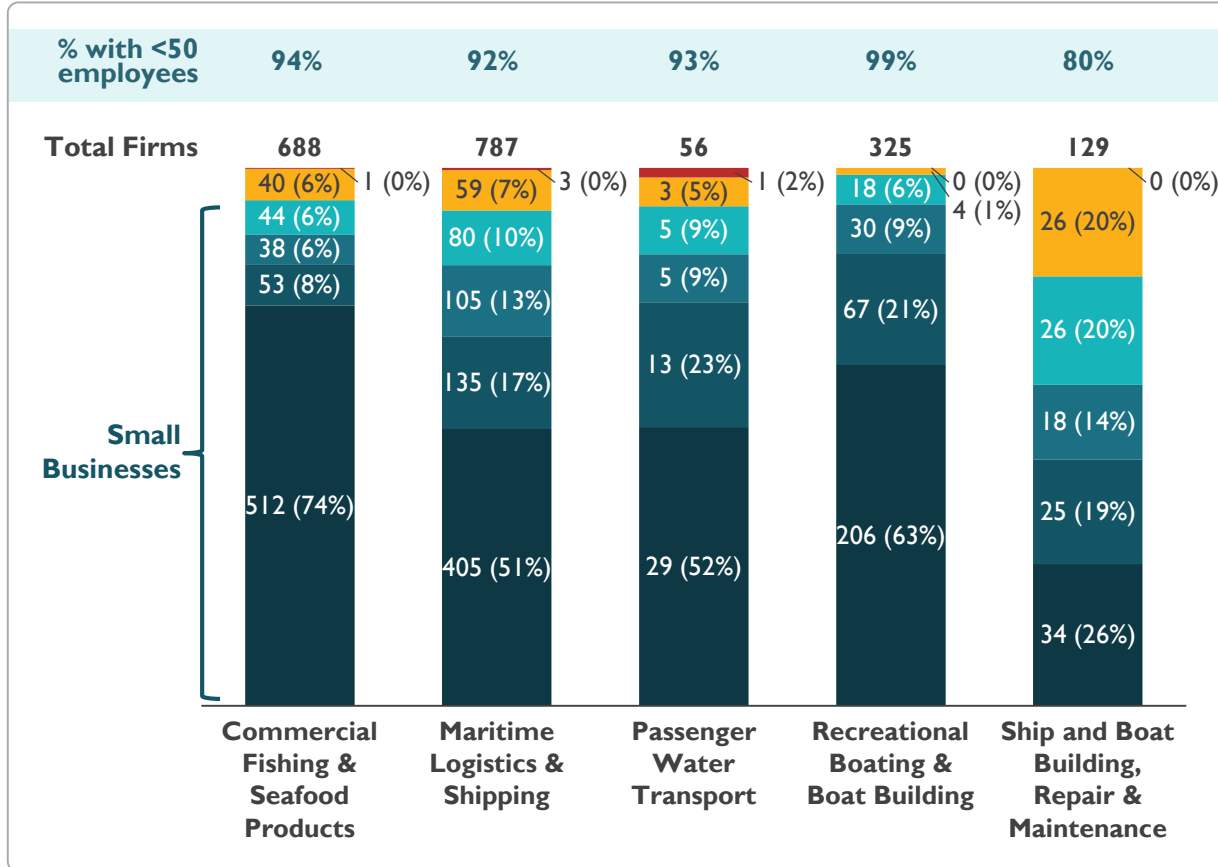
Source: Firms & employment data from U.S. Census Bureau 2016 Business Patterns (WA state; 6-digit NAICS codes); Annual wage data from WA state 2016 Quarterly Census of Employment and Wages; Median small business revenue from ArcGIS Business Analyst

*MIT Living Wage for the State of Washington for a family of 2 adults and 1 child is \$61,988 / year

X CORE MARITIME INDUSTRIES: FIRM DATA

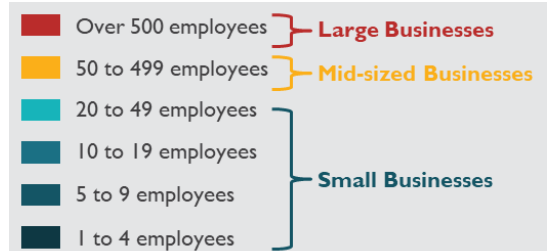
While all segments are predominantly comprised of small businesses, differences in more specific business size distribution may suggest different needs and level of interest in scaling operations

Small Businesses' Share of Core Maritime Industry Segments



Analysis

- > While all segments are almost entirely comprised of small businesses, **Commercial Fishing & Seafood is particularly skewed toward microbusinesses (<4 employees)**
 - This suggests either limited appetite or resources for scaling
- > The size distribution in Ship and Boat Building suggests that this segment contains businesses of **various stages and/or focuses, which may be looking to scale further**



Source: U.S. Census Bureau 2016 Business Patterns (WA state; 6-digit NAICS codes)

X CORE MARITIME INDUSTRIES: FIRM DATA (2 OF 2)

Layering on differences in average revenue per business provides insight into which segments are particularly lucrative for small businesses and where there are likely significant non-wage capital needs

Average Revenue per Business*

	Commercial Fishing & Seafood Products	Maritime Logistics & Shipping	Passenger Water Transport	Recreational Boating & Boat Building	Ship and Boat Building, Repair & Maintenance
20 to 49 employees	\$15.6M	\$6.4M	\$5.4M	\$9.3M	\$5.1M
10 to 19 employees	\$6.5M	\$2.4M	N/A	\$3.7M	\$3.6M
5 to 9 employees	\$1.8M	\$1.4M	\$1.3M	\$2.1M	\$1.6M
1 to 4 employees	\$1.1M	\$542K	\$462K	\$724K	\$287K

Analysis

- > **Segments' business size profiles do not appear to be positively correlated with average revenue**
 - Commercial Fishing & Seafood Products has the highest average revenue for all small business size sub-categories, despite having the highest proportion of microbusinesses – this suggests that the industry may be more lucrative and/or that it is easier for very small businesses to capture market share
- > **Two of the segments with the lowest wages (sub-living wage) are those with the highest average business revenue (Commercial Fishing & Seafood and Recreational Boating & Boat Building), suggesting that these segments may have other significant non-wage operational expenses / capital requirements**

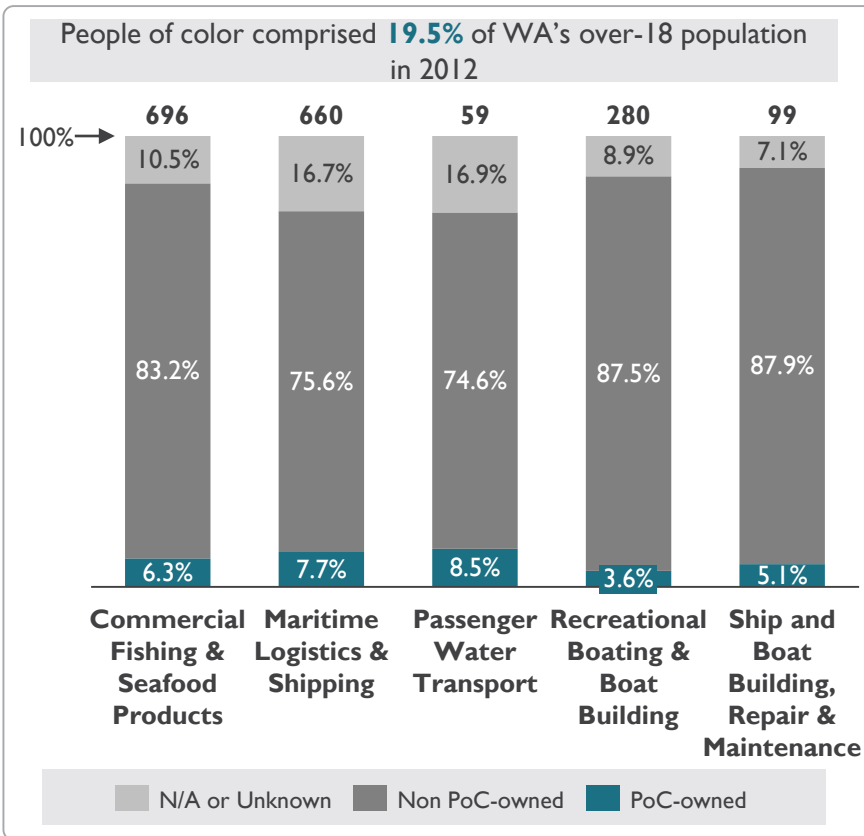
Source: ArcGIS Business Analyst

*Note: Data based on businesses included in the ArcGIS Business Analyst tool and may not reflect all businesses in these clusters; however, they should be roughly representative

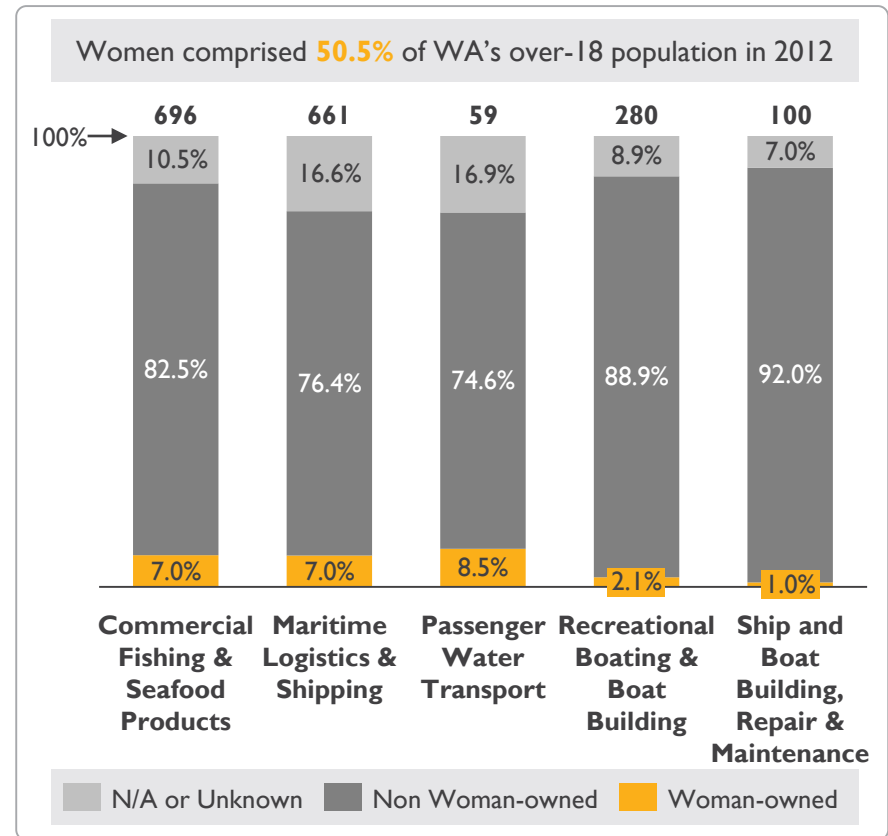
X DEMOGRAPHIC BREAKDOWN: TOTAL FIRMS

All segments of the core maritime sector have very low representation of business owners of color and women – no segment exceeds 10% representation in either demographic

Person of Color-owned Businesses' Share of Total



Woman-owned Businesses' Share of Total



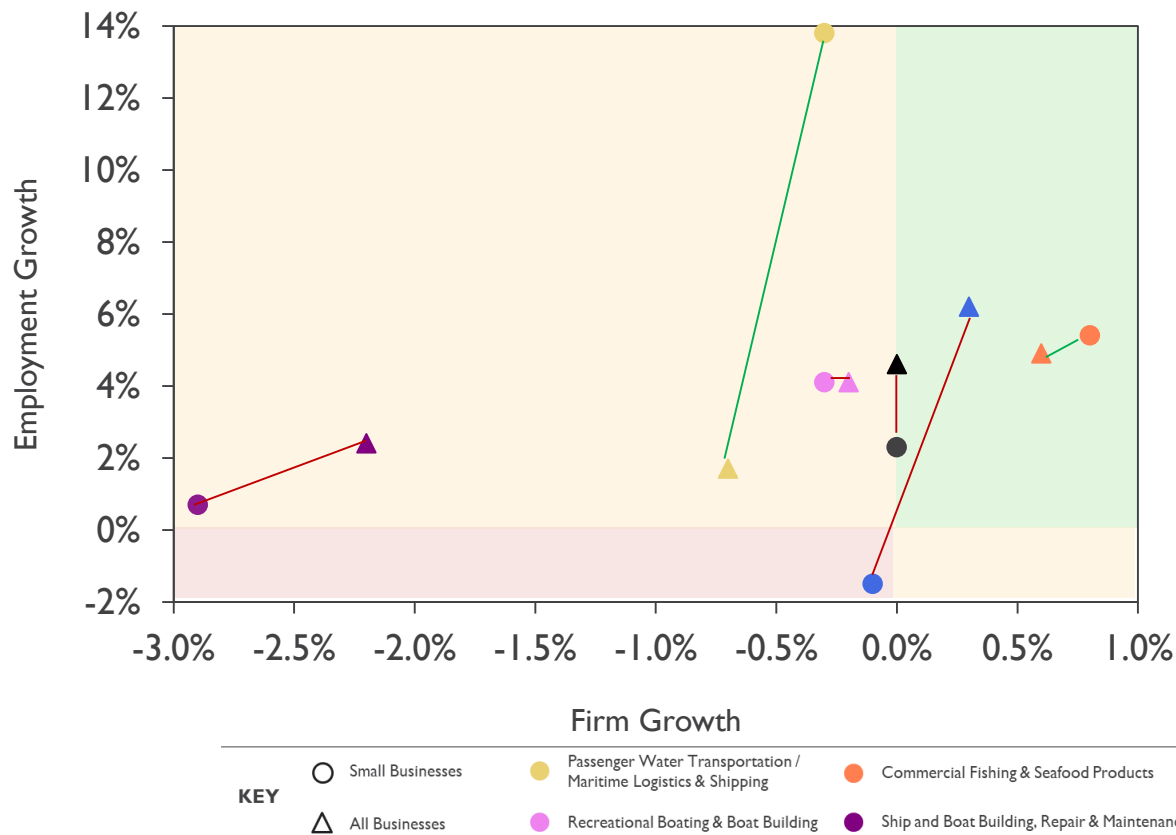
Source: U.S. Census Bureau 2012 Survey of Business Owners (State-level, using 6-digit NAICS codes); 2012 American Community Survey

Note: Totals do not match exactly due to rounding error in dataset

X GROWTH RATES: STATE OF WASHINGTON

Small business growth lags that of core maritime firms overall – particularly in capital-intensive segments – but the segment that includes water transportation appears to contain some especially high-performing small businesses

Growth by Industry Segment (CAGR 2012-16)



Analysis

- > Overall, the **number of maritime businesses has been steady** in past years, though **employment (and thus, average firm size) has grown modestly**
- > In **industries with large capital requirements** and economies of scale (e.g., Ship Building, aspects of Maritime Logistics & Shipping like specialized warehousing), **small business growth has lagged behind that of larger companies**
- > In the segment that includes **water transportation, however, small business employment growth outpaces the overall trend**, even as the number of firms decreases
 - This suggests that there are particularly high-growth small businesses in this segment

Source: U.S. Census Bureau Business Patterns (4 and 5-digit NAICS codes); yellow markers represent NAICS codes for which it was not possible to break out Maritime Logistics & Shipping vs. Passenger Water Transportation activities at the 4- or 5-digit level (e.g., deep sea, coastal, and inland transportation & shipping)

X NON-CORE MARITIME INDUSTRY DEFINITION

The following are the NAICS codes used for analyzing the non-core maritime industry segments

Sub-Sector	NAICS Code
Environmental Services	Environmental Consulting Services
	Environmental Remediation Services
	Surveying & Mapping (except Geophysical) Services
Energy	Hydroelectric Power Generation
	Other Power Generation (<i>incl. tidal</i>)
Naval Architecture	Engineering Services
Naval Science & Technology (S&T) and R&D	Research & Development in the Physical, Engineering & Life Sciences (except Nanotechnology & Biotechnology)
Other Logistics	Specialized Freight (except Used Goods) Trucking, Long Distance
	Specialized Freight (except Used Goods) Trucking, Local
	Commercial Air, Rail, and Water Transportation Equipment Rental & Leasing
	Line-Haul Railroads
Other Manufacturing	Other Engine Equipment Manufacturing (<i>incl. marine</i>)
Other Related Technologies	<p><i>Captured in other NAICS codes, e.g.:</i></p> <ul style="list-style-type: none"> > Search, Detection, Navigation, Guidance, Aero & Nautical System & Instrument Manufacturing > Research & Development in the Physical, Engineering & Life Sciences

X NON-CORE MARITIME SECTOR OVERVIEW

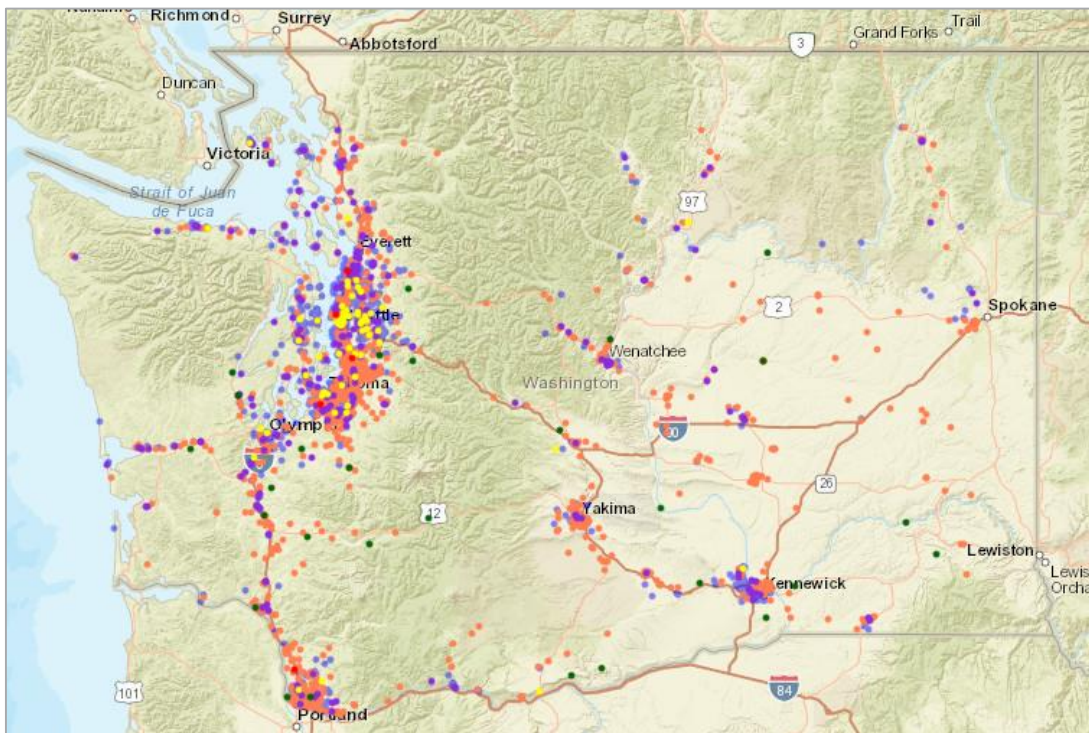
Because these NAICS codes are not all strictly maritime-related, it is useful to understand the contents of each industry segment more deeply than NAICS codes alone allow

<u>Sub-Sector</u>	<u>Description</u>
Environmental Services	Includes cleanup of contaminated buildings, soil, and water (e.g., waste water treatment, oil spill cleanup); also includes consulting services to businesses and other organizations to assist them in controlling their environmental impact (e.g., through responsible waste management), as well as surveying and mapping services
Energy	Includes hydroelectric and tidal power generation
Naval Architecture	NAICS code includes a broad array of engineering services beyond naval architecture (e.g., civil engineering, construction engineering, mechanical engineering services, etc.)
Naval Science & Technology (S&T) and R&D	Includes research and development in oceanography, fisheries, life sciences, environmental science, electronics, physics, etc.; research can be conducted at universities, government laboratories, private sector organizations, etc.
Other Logistics	Includes specialized (refrigerated) trucks that transport perishable goods (e.g., seafood) over both short and long distances, freight railway operations, and leasing of transportation equipment
Other Manufacturing	Includes manufacturing of marine engines (though included NAICS code is not exclusively for marine engines)

X NON-CORE MARITIME INDUSTRY DISTRIBUTION

There will likely be a strong correlation between which industries the Dept of Commerce prioritizes and where, geographically, it needs to build partnerships, investigate deal prospects, and channel capital

Geographic Distribution of Small Businesses in State of WA



KEY	Research & Development	Other Logistics	Engineering & Naval Architecture
	Energy	Environmental Services	Manufacturing

Analysis

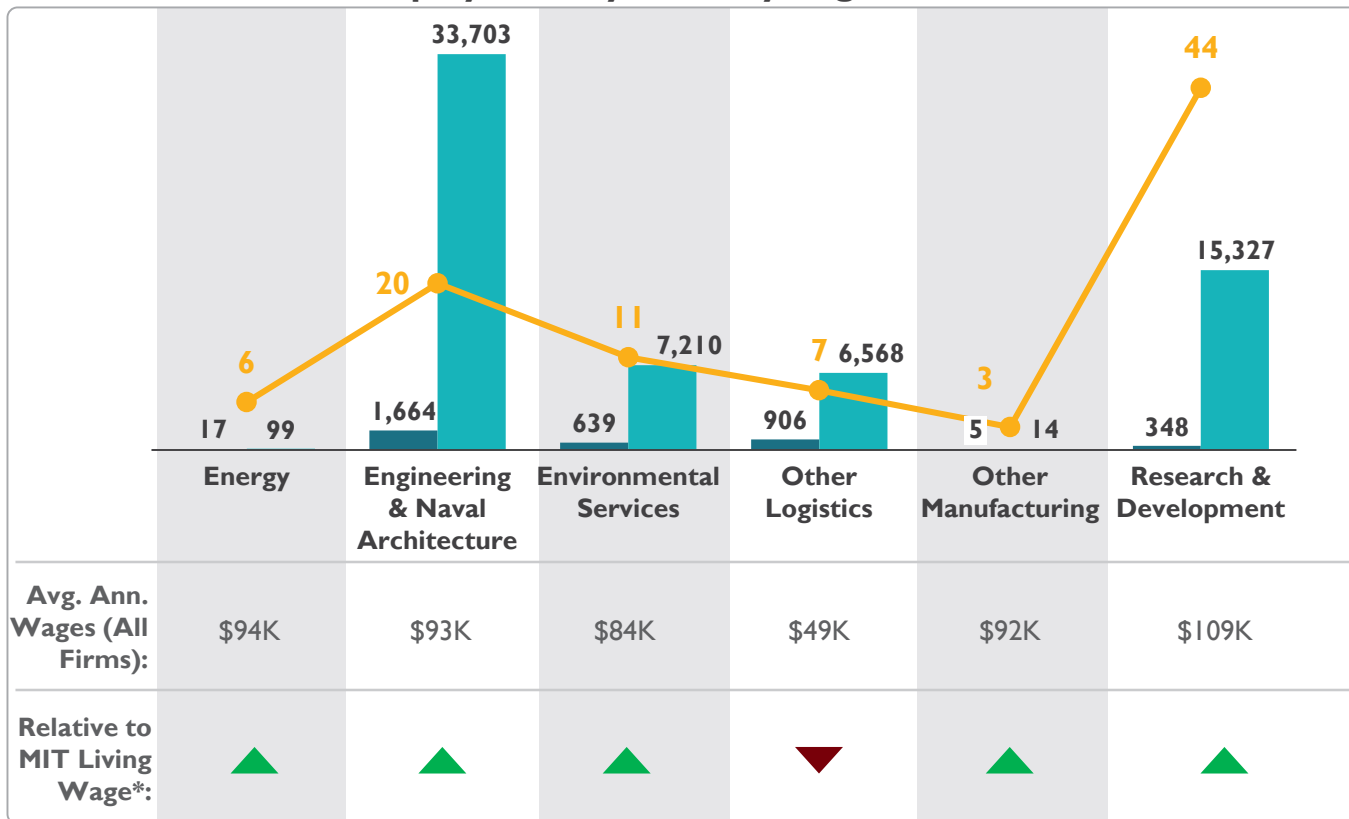
- > Like the core maritime industries, non-core industries are primarily clustered in the Seattle-Tacoma-Bellevue MSA
- > However, compared to the core maritime industries, non-core industries show **stronger clustering in inland cities** (e.g., Yakima, Kennewick, greater Portland) – **especially Other Logistics**
- > **Some segments (e.g., R&D, Manufacturing) are narrowly clustered in the Seattle-Tacoma, Bellevue MSA**, likely because this area is a hub for research and technology industries in general
- > **Others, like Energy have a small footprint and are highly geographically dispersed**

Source: ArcGIS Business Analyst; 1 dot = one business with under 50 employees; 6-digit NAICS codes

X NON-CORE MARITIME INDUSTRIES: FIRMS & EMPLOYMENT

The non-core maritime industries tend to be smaller and higher-paying than the core industries, as they are more technology-driven and specialized

Firms and Employment by Industry Segment: State of WA



■ Total Firms
 ■ Total Employment
 ● Avg. Employees / Firm

Analysis

- > There is a small concentration of relevant Energy and Other Manufacturing firms in WA; **stronger clusters include Engineering & Naval Architecture and Other Logistics**
- > Non-core maritime businesses **tend to be smaller than core maritime businesses**, with the exception of the R&D segment
- > **Salaries in non-core maritime industries, except for Other Logistics, are substantially higher** than in core-maritime segments because these segments are **more technology-driven**

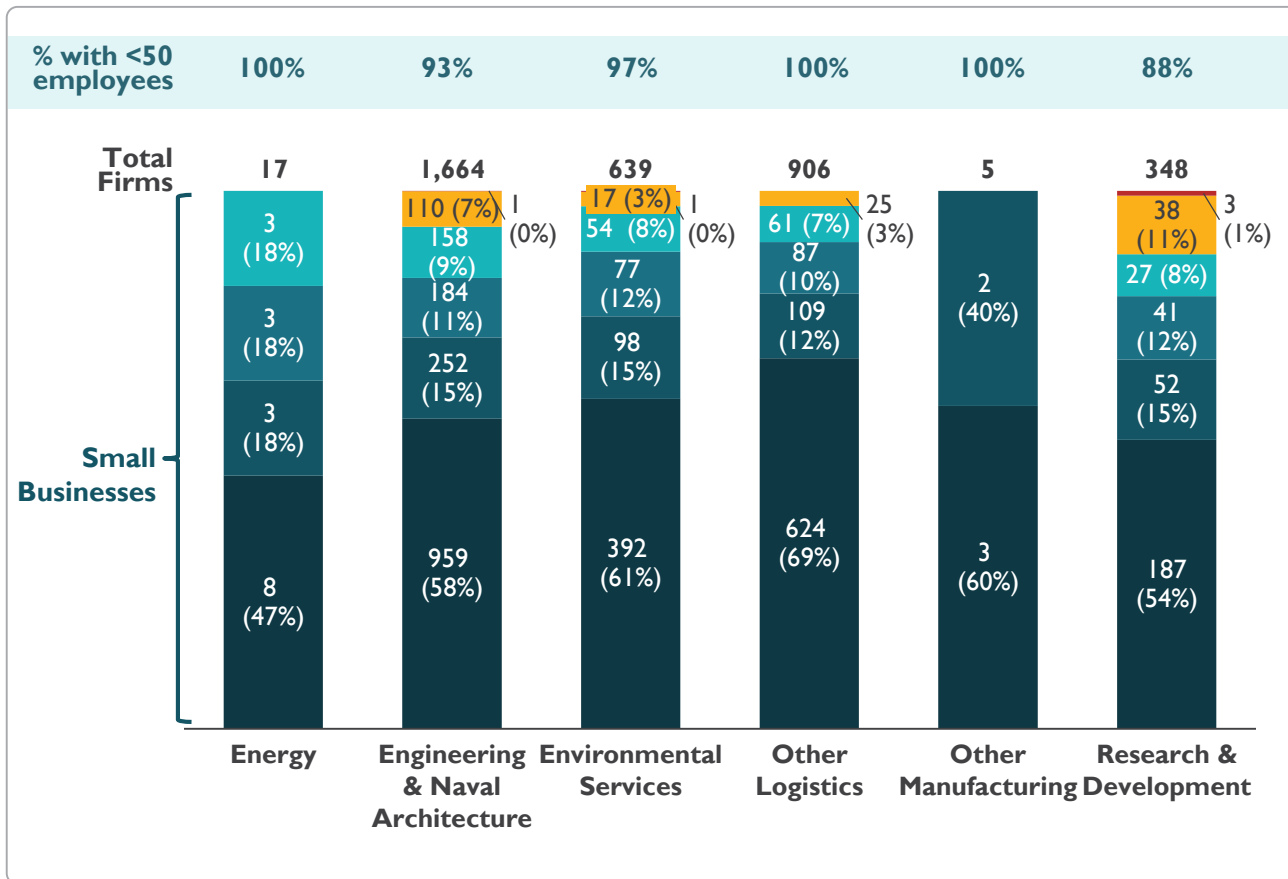
Source: Firms and employment data from U.S. Census Bureau 2016 Business Patterns (WA state; 6-digit NAICS codes); Annual wage data from WA state 2016 Quarterly Census of Employment and Wages

*MIT Living Wage for the State of Washington for a family of 2 adults and 1 child is \$61,988 / year

X NON-CORE MARITIME INDUSTRIES: FIRM DATA (1 OF 2)

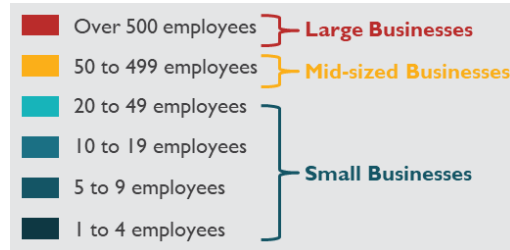
While businesses in these industries are almost all small, the range of sizes and stages they represent suggests a diverse set of capital needs

Small Businesses' Share of Non-Core Maritime Industry Segments



Analysis

- > With the exception of R&D, non-core maritime industries are **almost entirely comprised of small businesses**
- > Though most businesses are small (<50 employees), **the variation in firm sizes within that range suggests a variety of potential capital needs** (e.g., from seed/angel investment or grants through larger loans and/or equity)



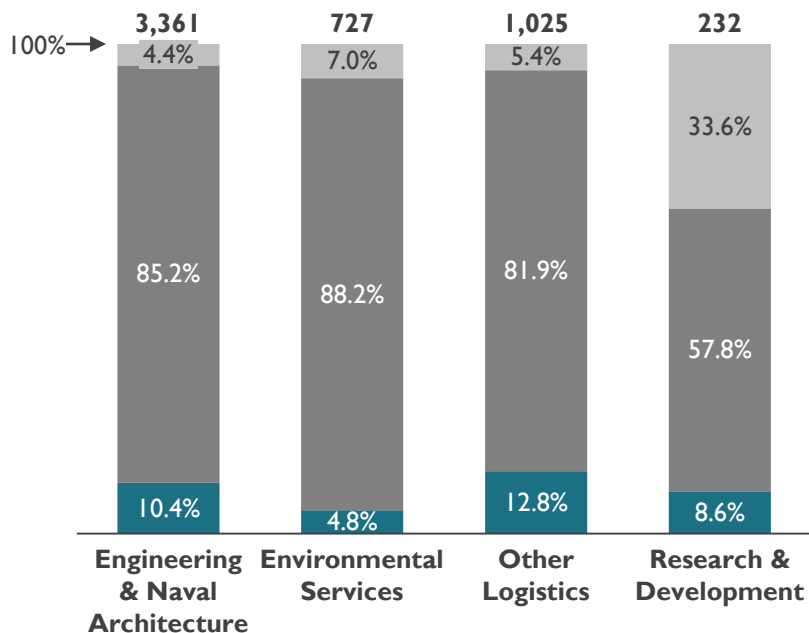
Source: U.S. Census Bureau 2016 Business Patterns (WA state; 6-digit NAICS codes)

X DEMOGRAPHIC BREAKDOWN: TOTAL FIRMS

While non-core maritime industries have greater representation of people of color and women than do the more traditional maritime industries, they still have little demographic diversity

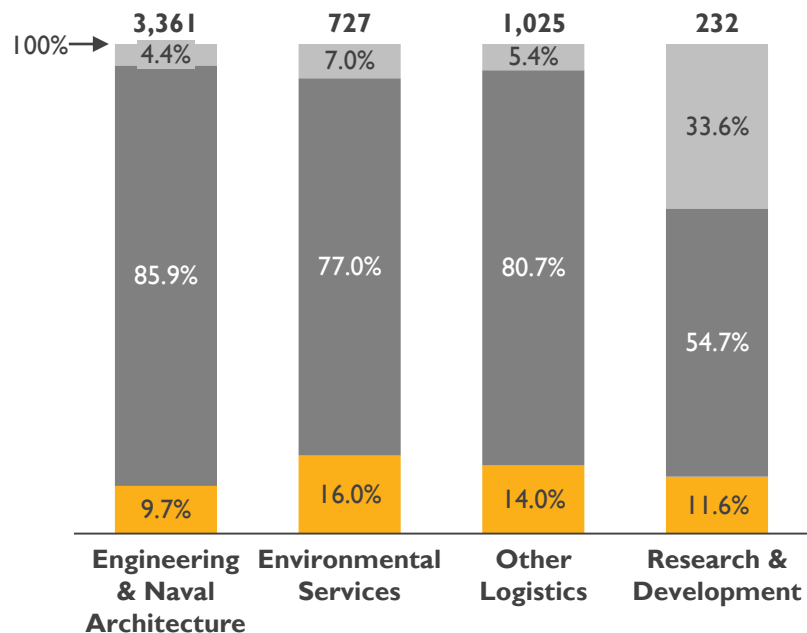
Person of Color-owned Businesses' Share of Total

People of color comprised **19.5%** of WA's over-18 population in 2012



Woman-owned Businesses' Share of Total

Women comprised **50.5%** of WA's over-18 population in 2012

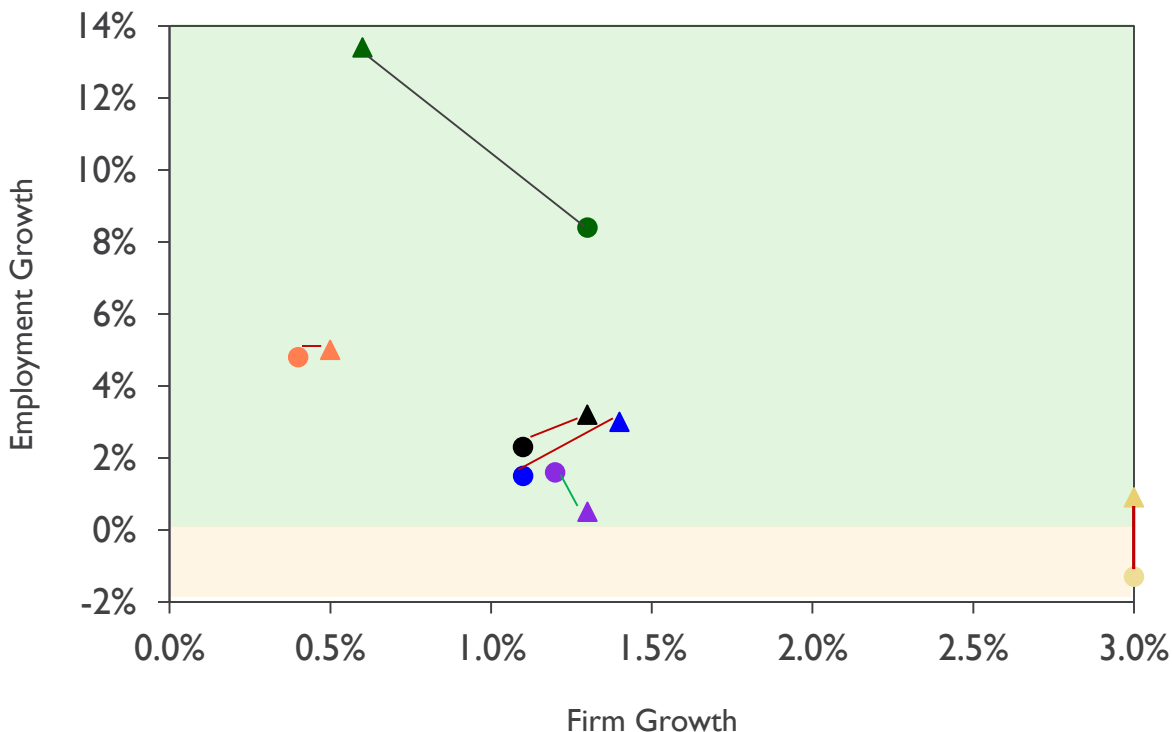


Source: U.S. Census Bureau 2012 Survey of Business Owners (State-level, using 6-digit NAICS codes; data unavailable for Energy and Other Manufacturing); 2012 American Community Survey

X GROWTH RATES: STATE OF WASHINGTON

In contrast with core maritime industry trends, small business growth trends in non-core maritime industries have been positive and have tracked closely with overall industry trends

Growth by Industry Segment (CAGR 2012-16)



Analysis

- > With the exception of small R&D organizations, **all non-core maritime segments have been experiencing growth in both firm count and employment** – this applies to small businesses and firms overall
- > **Small business growth performance has tracked closely to overall growth rates** in recent years
- > The main exception is the Energy segment, where small firms have seen lower employment growth than firms overall
 - This could suggest acquisitions in the segment and/or the existence of a/some high-growth, larger player(s) in the Energy segment

KEY

- | | | | |
|--------------------|--------------------------|--------------------------|---|
| ○ Small Businesses | ● Research & Development | ● Other Logistics | ● Engineering, Architecture & Surveying |
| △ All Businesses | ● Energy | ● Environmental Services | ● Non-Core Maritime Sector Total |

Source: U.S. Census Bureau Business Patterns (4 and 5-digit NAICS codes); Manufacturing excluded due to very limited number of businesses

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X CASE STUDY: BOSTON (1 OF 2)

Overview of Maritime Economy & Key Industry Clusters

The Port of Boston is the largest port in Massachusetts and a key port along the seaboard of the East Coast. In 2019, The Port generated \$8.2b in economic activity and supported 66,000 jobs through direct and indirect effects.

- > **Shipping:** 2018 marked the fourth consecutive year of record-high container volume at the Port of Boston; a \$350m improvement project is underway to deepen the Port for usage by even larger container vessels
- > **Seafood processing:** Although the number of employees and establishments in this sector have declined with globalization and advances in processing technology, the sector remains strong – the occupancy rate of processing spaces in Boston was 94% in 2015
- > **Tourism and recreation:** The Port’s Flynn Cruiseport saw record volume in 2018, with more than 150 ship calls and 390,000 passengers; additional tourism activity includes seafood-based tourism, passenger boat rentals, and scenic harbor tours
- > **Ship repair:** While shipbuilding has been in a slow decline in Boston and Massachusetts, the ship repair sector remains a growing industry due to the high volume of fishing and tourism vessels that traffic the Port

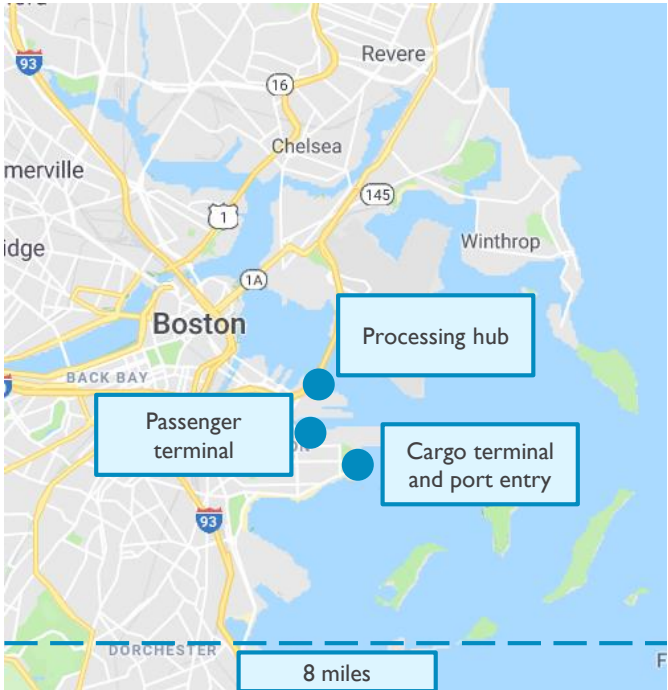
Key Maritime Economy Stakeholders

- > **Port of Boston:** the Port is administered by the state’s Massachusetts Port Authority, which is an independent public authority, to a state agency; the members of the 6-person board are appointed by the governor
- > **SeaAhead:** SeaAhead is a Benefit Corporation with the mission of supporting new venture development in the Blue Economy; ecosystem stakeholders and member organizations include scientists, corporations, and local and regional government organizations

Key City Info

Population <i>(metro region, 2015)</i>	4,628,910
Port volume <i>(TEUs, 2018)</i>	298,000
Port volume % change <i>(2014-2018)</i>	+25%

Map of Key Assets



Source: Commonwealth of Massachusetts, UMass Dartmouth, Associated Industries of Massachusetts, SeaAhead

X CASE STUDY: BOSTON (2 OF 2)

Capital Activity and Illustrative Deals

- > Stakeholders in **Boston-area maritime investments vary widely by subsector in what is a still-developing ecosystem**; defense contractors continue to drive innovation and funding in maritime technology and robotics, with European investors providing capital for shipping and other cargo ventures

Illustrative deals

- > In 2018, the **Massachusetts Technology Collaborative announced a new grant initiative that would allocate up to \$500,000** for innovation in seaport communities; the grant program is accepting a wide range of potential solutions, including those related to fisheries, shipping, and renewable energy
- > Boston-based **Sea Machines Robotics closed a \$10m Series A round in 2018**; the round was led by Accomplice Capital, a Cambridge-based venture firm, but included investors from across the U.S.
- > In 2018, **Shell's New Energies division partnered with EDP Renewables on a \$135M bid** to develop wind farms offshore of the Boston harbor

Sample Sustainability Efforts

- > Boston's high-tech **acquaculture firms employ filtration and temperature control systems that eliminate environmental impact**, avoiding disruption of the coastal ecosystems
- > The Massachusetts Port Authority has been a **national leader in sustainability efforts for more than a decade, including sustainability cruiseport rehabilitation in 2010 and installation of shore power at the fish pier in 2011** been; recent efforts include altering emergency systems to remain floodproof with rising sea levels

Key Challenges

- > **Unclear path to grow for small innovative maritime companies:** Maritime technology and innovations grown out of Boston's robust ecosystem of research institutions and universities report that access to capital, customers, and markets are a persistent challenge; product development is often driven by historical customers (e.g., defense contractors)
- > **Workforce shortage:** In a 2017 survey of more than 700 business owners in the Massachusetts maritime economy, 50% of respondents indicated "availability of skilled works" was a "very challenging" issue for doing business

Potential Solutions

- > **Increased coordination among maritime businesses and stakeholders:** Only 47% of maritime business owners in Massachusetts are a member of an industry association; efforts like SeaAhead and the Bluetech Innovation Hub can help connect businesses across sectors and drive collaboration and growth
- > **Addressing gaps in capital ecosystem:** The tech ecosystem in Boston and Cambridge is take advantage of the dense concentration of maritime industries and research; new industry collaborations and innovation hubs can help attract capital by demonstrating an ecosystem of better-supported small businesses

Source: Commonwealth of Massachusetts, UMass Dartmouth, Associated Industries of Massachusetts, SeaAhead

- 1** **Grant programs driving innovation:** The Massachusetts Technology Collaborative grant program focused on coastal innovation is helping to fill the capital gap for small maritime businesses who are unable to find venture funding; by expanding and sustaining this program, the state and interested stakeholders may be able to support small business innovation at a level that attracts the interest and investment of venture capitalists who are focused on maritime tech
- 2** **Maritime and tech stakeholders collaborating for better ecosystem support:** The Bluetech Innovation Hub at the Cambridge Innovation Center is a direct response to the need for a support ecosystem for maritime technology; similarly, SeaAhead was founded to help make connections between investors, researchers, business owners, and other maritime stakeholders in order to better drive innovation and collaboration within the Blue Economy
- 3** **Innovation within historical key industries:** Recognizing the importance of seafood processing to the Boston and Massachusetts economies, aquaculture firms in the Boston maritime economy are employing technology that allows for the successful development of aquaculture products without disrupting local waterways and the sectors dependent on them; this approach allows both traditional and new approaches in this sector to thrive

X CASE STUDY: OSLO (1 OF 2)

Information here concerns the Oslo metropolitan region (more national information is available on the following slide)



Oslo

Overview of Maritime Economy & Key Industry Clusters

The Port of Oslo is the largest public multi-purpose cargo port in Norway, leading all Norwegian ports in container and passenger volume. In 2017, a survey of more than 250 international maritime experts ranked Oslo 3rd on a list of leading maritime capitals, a consideration of Oslo's performance in four maritime sectors: shipping, finance and law, technology, and ports and logistics.

- > **Shipping:** Oslo is one of the world's leading shipping hubs, with centuries of experience as a major hub. Nearly 6,000 ships dock at the Port of Oslo annually, carrying a total of 6 million tons of cargo and more than five million passengers
- > **Maritime finance and law:** Oslo's role in the world maritime economy has made it a hub for related services; the region is home to major shipping investors, maritime banks, and traders
- > **Oil drilling:** Norway is a world leader in offshore drilling, ranking 4th, behind Saudi Arabia, in oil production per capita
- > **Technology and innovation:** a 2019 study ranked Oslo as the top maritime city for technological innovation; major research efforts, especially those related to the Blue Economy, are clustered around the University of Oslo

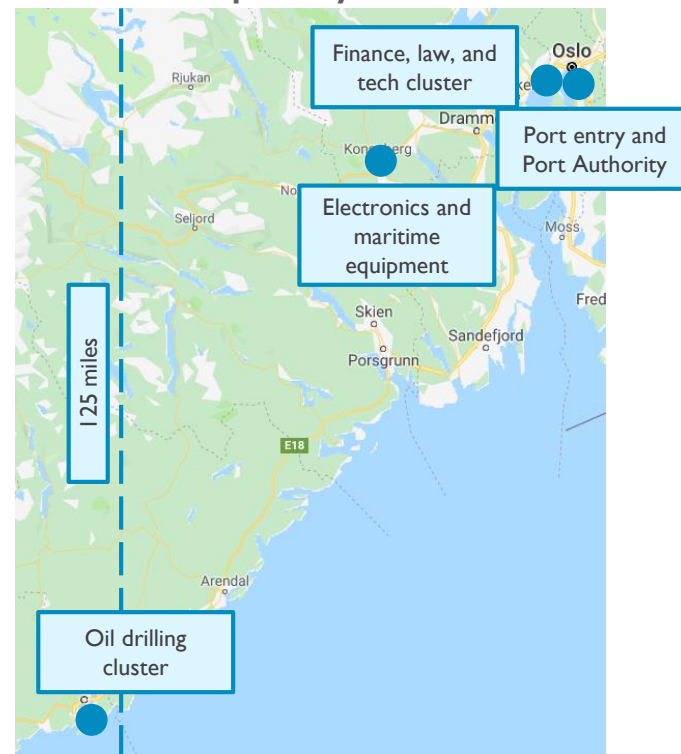
Key Maritime Economy Stakeholders

- > **Oslo Port Authority:** a municipal agency that operates and oversees the Port of Oslo; managed by an elected board and Port Director
- > **Oslo Maritime Network:** a non-profit membership network comprised of organizations throughout the greater Oslo region's maritime cluster, including shipping companies, environmental organizations, and research groups
- > **Innovation Norway:** the Norwegian government's effort for innovation and development of Norwegian enterprises and industry; given the maritime sector's importance in Norway, Innovation Norway funds and supports a number of key maritime efforts, including the Global Centers of Expertise, which include several dedicated maritime industrial clusters

Key City Info

Population <i>(metro region, 2015)</i>	1,546,706
Port volume <i>(TEUs, 2018)</i>	238,000 (est.)
Port volume % change <i>(2014-2018)</i>	+19%

Map of Key Assets



Source: Norway Exports, Blue Maritime Clusters, OECD, Next Street interviews, Innovation Norway, WA Dept. of Commerce

X CASE STUDY: OSLO (2 OF 2)

This slide discusses more national deals and initiatives to capture a more representative picture of Norway's maritime economy



Oslo

Capital Activity and Illustrative Deals

- > In 2019, the Norwegian government announced that it was **doubling the allotment of the sovereign wealth fund available for investment in unlisted renewable energy ventures to \$14B**; unlisted energy projects (generally smaller and newer ventures) represent more than two-thirds of the full green energy market
- > Innovation Norway serves **primarily as a bank, co-financing about 6,000 projects in Norway, the bulk of which go to maritime businesses and those in the adjacent energy and technology sectors**; capital is provided in the form of loans, guarantees, and grants, but no equity

Illustrative deals

- > In 2017, Innovation Norway's export credit program helped fund the conversion of a Danish container ship to hybrid power with a **guaranteed \$1m loan**; **Norwegian Electric Systems provided the batteries for the ship**, which were then installed at a shipyard in the Faroe Islands
- > In 2018, Longship, an **Oslo-based private equity firm, acquired 100% of Nofitech, a Norwegian small business that develops aquaculture technology**; in 2017, Nofitech had approximately \$10M in revenue and 6 employees
- > Several shipping companies, including some based in Oslo, **joined together in 2017 to build a \$150m fund to provide alternative financing to shipping companies** both in Norway and around the world

Sample Sustainability Efforts

- > In May 2019, Innovation Norway and the State of Washington entered into an agreement that, among other efforts, sets **goals for decarbonization, maritime technology innovation, digitization of maritime data, and developments of sustainable aquaculture**
- > Blue Growth for a Great Future is **the Norwegian government's maritime strategy, and includes key initiatives to stimulate green growth** in the maritime industry and the use of environmentally friendly technology and fuels
- > **By 2030, only ships with low- or zero-emission technology** will be granted access to fjords and other Norwegian water space

Key Challenges

- > **Underdeveloped tech startup ecosystem:** Much of Norway's small business development is funded and supported by government initiatives, with banks and PE focused on larger deals
- > **Limited maritime VC:** The Norwegian venture capital ecosystem is very young, with few highly established firms. Most finance is focused on large-scale shipping investment, drawing on historical strengths and areas of expertise
- > **Oil declining:** Facing labor shortages and pressure from environmentalists, Norwegian oil production is in steady decline, with some experts projecting that 2019's production could be the lowest in more than 30 years

Potential Solutions

- > **Government financial support of maritime ventures:** In the absence of a more developed tech venture ecosystem, especially in maritime, the Norwegian government supports small businesses and stimulates innovation through a variety of financial measures, including funding innovation partnerships between smaller companies and large corporations
- > **Traditional industries investing in clean tech:** The Norwegian sovereign wealth fund is comprised of surplus revenues from the oil sector; as oil production declines, the fund is investing in renewable energy ventures that may in turn generate surpluses for the fund

Source: Norway Exports, Blue Maritime Clusters, OECD, Next Street interviews, Innovation Norway, WA Dept. of Commerce



- 1 Multiple forms of government support for maritime industries and innovation:** Norwegian government supports small businesses through a variety of financial measures, including export credits, Innovation Contracts that fund partnerships with larger corporations, and grants to support pilot programs in environmental and technological innovation; these programs help support and sustain a maritime small business ecosystem in the absence of a more developed maritime capital landscape
- 2 Traditional industries investing in disruptive technologies:** The Norwegian sovereign wealth fund, is the world's largest, controlling over \$1 trillion in assets; by divesting in oil (the source of its funding) and investing instead in renewable energy, the fund is providing substantial support for emerging clean tech as Norwegian oil production declines due to market and political pressure
- 3 Key support services attract international business:** In addition to water-based and traditional industries, Norway's large maritime economy has produced robust business support and financial services that attract activity and investment from international stakeholders

X CASE STUDY TEMPLATE FOR DISCUSSION (1 OF 2)

Overview of Maritime Economy & Key Industry Clusters

The Port of Rotterdam is the largest port in Europe. Through direct and indirect effects, the port sustains more than 345,000 jobs and contributes €45.6 billion to the Netherlands' economy, representing more than 6% of GDP. Key clusters include:

- > **Shipping:** In 2018, more than 29,000 seagoing and 107,000 inland vessels passed through Rotterdam, making Rotterdam the 11th busiest port in the world
- > **Ship repair:** Rotterdam is home to 3 dedicated repair shipyards, 11 repair-specific docks, and various diving repair companies to accommodate the various sizes of seagoing and inland vessels that traffic the port
- > **Oil and chemical:** Rotterdam is one of the world's largest fuel hubs, with 5 oil refineries and 45 chemical companies based in and around the port
- > **Biofuel and wind power:** Cleaner energy production has clustered around the port's oil and chemical production, providing more than half of the Netherlands' power production
- > **Marine business services:** Inland, there is a well organized cluster of maritime-specific services provided by banks, insurance companies, insurance brokers, lawyers, accountants, and tax consultants

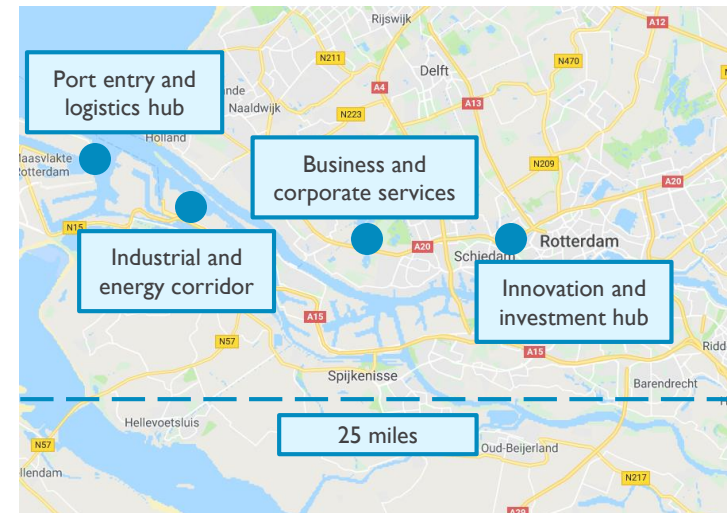
Key Maritime Economy Stakeholders

- > **Port of Rotterdam Authority:** a government corporation that operates the port, jointly owned by Rotterdam and the Dutch national government
- > **Maritime by Holland:** a privately-funded business network that identifies and co-finances a range of projects that draw on multiple sectors across the Dutch maritime industry
- > **Rotterdam Maritime Capital:** a collaboration between businesses, government agencies, associations, institutions in Rotterdam's maritime economy that seeks to spur international investment

Key City Info

Population <i>(metro region, 2015)</i>	2,563,197
Port volume <i>(TEUs, 2018)</i>	14.5 million
Port volume % change <i>(2014-2018)</i>	+17.8%

Map of Key Assets





X CASE STUDY TEMPLATE FOR DISCUSSION (2 OF 2)

Capital Activity and Illustrative Deals

- > **PortXL is a Rotterdam-based accelerator** that financially supports new maritime businesses during a year-long cohort program in return for an equity stake; the accelerator preferences businesses with an explicit focus on disrupting conventional maritime industries
- > **GetFunded is a city of Rotterdam program** that helps small businesses apply for various sources of European innovation grants; this year's cohort of 7 includes high-tech solutions for ship repair, docking, and logistics
- > **A German maritime technology investment firm, TecPier**, announced earlier this year that they will explore investments between €200k and €250k for companies that have completed Rotterdam-area accelerator programs

Illustrative deals

- > **Dutch bank ING and the European Investment Bank have each contributed €150m** to support projects with a “green innovation element” in Europe’s maritime sector; one early investment was 110m to a Dutch shipping company to retrofit 42 ships with exhaust gas cleaning systems and ballast water management systems
- > Over the past 2 years, **Mainport Innovation Fund, a Dutch fund investing in logistics and transport**, has invested more than €7m in seed and Series A funding for Netherlands-based maritime technology firms

Sample Sustainability Efforts

- > **Rotterdam awards port dues discounts via the “Green Award”** to any seagoing tankers or shipping companies that demonstrate investments in improving environmental performance
- > The Port Authority has earmarked **€5 million of its Climate-Friendly Shipping initiative to fund and develop low- or no-carbon fuel maritime projects**
- > The Port Authority has partnered with Dutch public works agencies **to relaunch a floating solar farm in unused harbor**; the new farm will be the largest ever in the Netherlands and is part of the port’s efforts towards cleaner energy creation

Key Challenges

- > **Transition to greener energy:** Rotterdam’s historical strength as a producer of carbon-based energy, as well as its role as a leading world port, creates tension with shippers from countries with less robust sustainability standards
- > **Port congestion:** Inefficient barge transportation from deep sea to inland terminals leads to significant delays and wasted fuel for shippers
- > **Low employment:** Worldwide maritime labor trends are also present in Rotterdam; new labor is below replacement levels for aging employees and owners in traditional industries (shipping, repair, recreation)

Potential Solutions

- > **Applications of new technology:** Dutch startup Captain AI has engineered self-driving boats and ships. This summer, the Port Authority is sending one of its own ships out to sea using CaptainAI technology; over time, this AI can alleviate port congestion and produce more efficient shipping routes, saving fuel and time
- > **Incentives for conversion to cleaner energy:** While investors may be slower to bet on green tech solutions to traditional shipping challenges, the Port and the Dutch Government offer shipping companies incentives to reduce carbon emissions, driving them to seek emerging solutions in the market

X CASE STUDY: TAKEAWAYS FROM ROTTERDAM

1

Innovation-first mindset: Maritime startups in the Netherlands are focused on high-tech innovations in traditional industries, (e.g., AI that captains ships, machine learning solutions to port logistics, cloud-based software to improve fuel efficiency). These solutions draw the interest of investors who are familiar with and interested in technology ventures

2

Government support for early-stage ventures and maritime innovation: The Dutch government provides substantial funding and programmatic support to early-stage maritime businesses, including assistance in applying for grants and establishing financial partnerships to fund innovations in green and blue tech. This support creates opportunities for early-stage maritime startups to develop without needing to seek additional forms of capital

3

Accelerators are a deliberate pipeline for investors: With early-stage investors cautious about returns on maritime investment, accelerators have become a particular proving ground for maritime startups; one such example is TecPier's commitment to make investments in companies that have completed Rotterdam-area accelerator programs, which reduces investment risk and creates a clear pipeline to investment for startups in an accelerator cohort

4

Attracting international capital: In 2018, Dutch accelerator HighTechXL held an invitation-only investment summit for Dutch startups and Chinese investors. The explicit goal was to attract international investment into the Dutch startup economy, but entrepreneurs also found the summit valuable for the access to potential markets and customers

X CASE STUDY: SAN DIEGO (1 OF 2)

Overview of Maritime Economy & Key Industry Clusters

The Port of San Diego is located within the San Diego Bay. In 2017, the Port's overall economic impact was \$9.4 billion. Roughly 70,000 jobs in San Diego County are generated by the Port; more than 44,000 of those are on the Port's waterfront and include shipbuilding and repair, cargo handling, tourism and hospitality jobs.

- > **Shipping:** San Diego is a leading cargo and recreational port; roughly 10% of cars imported to the U.S. come through the Port, and the 2018 cruise season brought 94 port calls and nearly 300,000 passengers
- > **Shipbuilding and repair:** Bolstered by the Navy's presence, San Diego is home to the West Coast's only major shipbuilding and submarine yards; smaller shipyards are developing to serve foreign recreational customers
- > **Ocean science and observation:** San Diego is home to leading institutions of both ocean and weather observation; in recent years, climate change has driven increased research and activity in this cluster
- > **Defense and security:** Inland, there is a well organized cluster of maritime-specific services provided by banks, insurance companies, insurance brokers, lawyers, accountants, and tax consultants

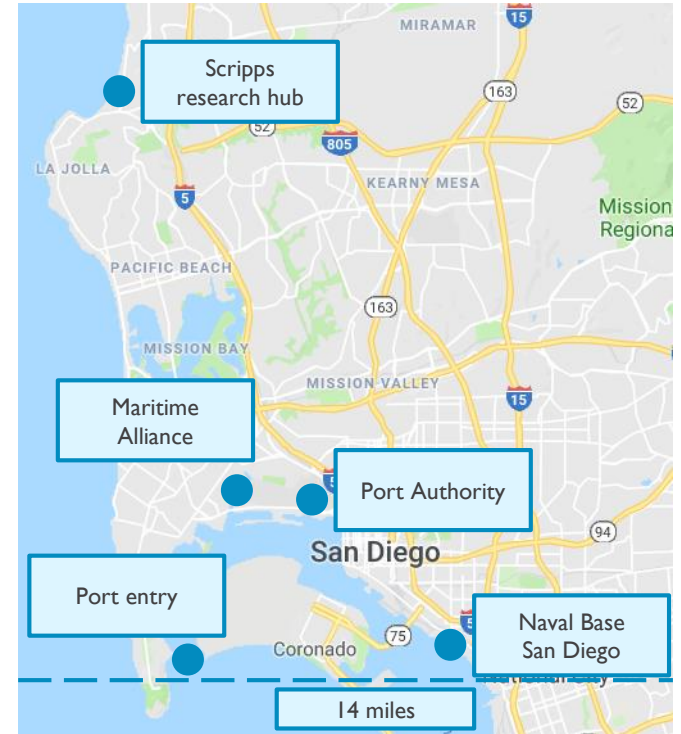
Key Maritime Economy Stakeholders

- > **Port of San Diego:** a public benefit corporation governed by Board of Commissions comprised of representatives from the 5 cities that border the San Diego Bay; established a Blue Economy Incubator in 2016
- > **The Maritime Alliance:** the non-profit industry association and cluster organizer for the San Diego maritime technology community; The Maritime Alliance represents the largest maritime (ocean and water) technology community in the U.S
- > **Scripps Institution of Oceanography:** one of the world's largest institutions for the study of ocean and Earth science; employs more than 1,200 academic and administrative staff

Key City Info

Population <i>(metro region, 2017)</i>	3,317,749
Port volume <i>(TEUs, 2018)</i>	130,000 (est.)
Port volume % change <i>(2014-2018)</i>	+18%

Map of Key Assets



Source: Port of San Diego, Logistics Management, American Association of Port Authorities, California DOT, BizJournals

X CASE STUDY: SAN DIEGO (2 OF 2)

Capital Activity and Illustrative Deals

- > In 2016, the Port established the Blue Economy Incubator **to remove “barriers to ocean entrepreneurs and provide key assets and services focused on pilot project facilitation”**; through 2018, the Port had launched 5 pilot projects ranging from shellfish nursery operations, copper remediation technology, a drive-in boatwash, a smart marina app, and a marine debris removal system.
- > Each year, 20 companies are invited to present to a panel of judges at a pitchfest during The Maritime Alliance’s Blue Tech week, with venture and corporate investors in attendance

Illustrative deals

- > Ocean Aero, which designs unmanned vehicles that operate both on the ocean surface and underwater, **closed a multi-million Series B in 2018 and has several corporate investors**, including Teledyne and Lockheed Martin
- > In 2018, **BlueNalu, a startup developing technology to grow seafood directly from fish cells, closed a \$4.5m seed round** just 2 months after announcing their launch; the round was led by New Crop Capital, a NYC-based food science venture fund
- > Aquacycles, a recreational water-borne bicycle company, was **able to raise funding through the 2018 Blue Tech Week pitchfest**; exact terms aren’t known, but businesses at the pitchfest seek between \$15k and \$250k

Sample Sustainability Efforts

- > The Port’s Board of Commissioners works aggressively to improve air quality and reduce greenhouse gas emissions; through the success of various initiatives, **greenhouse gas emissions at the port fell 34% from 2006 to 2016**
- > Currently, **70% of passenger vessel and refrigerated cargo fleets which visit the Port are using shore power** instead of running diesel engines in port
- > By order of the Port’s Green Truck Program, all heavy-duty trucks accessing the Port of San Diego maritime terminals **must comply with the clean air requirements under California’s drayage truck regulations**, including the requirement that trucks be year 2014 or newer

Key Challenges

- > **Workforce development:** As seen in other maritime economies, San Diego is challenged by an aging workforce, and a lack of training programs for traditional maritime trades
- > **Fractured maritime stakeholder ecosystem:** Stakeholders in the maritime sector report lack of coordination and heavy competition among smaller maritime economy development initiatives
- > **Limited early-stage and high risk capital:** As in Seattle, small businesses still struggle to attract early-stage capital that is willing to take a risk on the long development and revenue timelines in the Blue Economy

Potential Solutions

- > **Greater coordination among Blue Economy Initiatives:** The Maritime Alliance, along with smaller organizations like Blue Economy Strategies, are working to enlist San Diego stakeholders for greater cooperation on projects like Blue Tech Week and Seaport San Diego
- > **Blue Economy Incubator as hub for small business development:** Having a major organization, the Port of San Diego, develop a blue economy incubator can centralize funding initiatives and small business development as it grows and attracts more regional and national recognition

Source: Port of San Diego, Logistics Management, American Association of Port Authorities, California DOT, BizJournals

X CASE STUDY: TAKEAWAYS FROM SAN DIEGO

1

New markets for clusters with historical strengths: Shipbuilding and repair, robotics, and scientific observation are all maritime industry clusters that have a large presence in San Diego due to the Navy, but are finding other other markets and applications for their products and services, demonstrating the way traditional core and non-core industries can evolve

2

Dedicated Blue Economy incubator: The Port of San Diego's Blue Economy Incubator has proved to be an early success, launching 5 businesses across a variety of maritime industries. The Port is providing seed investment funds and expertise to support entrepreneurship, foster sustainable aquaculture, and help drive blue tech innovation, promoting small business innovation and development with the backing and partnership of a governmental organization and its partners

3

Visible and centrally-coordinated maritime tech conference: Blue Tech Week is a dedicated effort to make San Diego's maritime tech more visible to stakeholders both within the region and nationally. The conference attracts industry leaders, investors, and other maritime stakeholders in an effort to develop the San Diego maritime tech economy

4

Movement towards unified ecosystem support: Organizations like Maritime Blue and Blue Economy Strategies are working to coordinate Blue Economy stakeholders and initiatives for greater impact. Over time, this effort may overcome San Diego's fractured and competitive maritime stakeholder ecosystem, driving new growth and innovation through cooperation

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Full Industry Analysis

Peer City Case Studies

Illustrative Seattle Investments

X ILLUSTRATIVE INVESTMENTS IN SEATTLE MARITIME COMP'S

Company	Detail	Investment Round	Local Investors	National Investors
 Beta Hatch	Industrializing production of insects as sustainable protein for animal feed	Seed	<ul style="list-style-type: none"> > Element 8 > Keiretsu Capital 	<ul style="list-style-type: none"> > Frontier Angel Fund > Cavallo Ventures > NQV8
 IO Currents	Turns large scale maritime sensor data into actionable intelligence	Seed Series A	<ul style="list-style-type: none"> > Bellingham Angel Investors > Imagen 	
 Modumetal	Non-laminated alloy that will replace metals in many applications such as military armor and vehicles	8 rounds (\$65.2M); 5 venture rounds, 2 Convertible Notes, 1 Series A	<ul style="list-style-type: none"> > Flying Fish Partners > Vulcan > Second Avenue Partners > Steven Singh 	<ul style="list-style-type: none"> > BP Ventures > Conoco Phillips > Founders Fund > Catamount Ventures > Subversive Capital > Hercules Capital
 Pure Watercraft	Electric propulsion company designing and building electric powered recreational watercrafts	Debt financing – raised \$2.1M in 2016		
 Love the Wild	Sustainable fish entrees	Series A		<ul style="list-style-type: none"> > Aqua Spark > Leonardo DiCaprio Foundation
 Fish People	Seafood entrees and soups	Series B – raised a total \$12M		<ul style="list-style-type: none"> > Blueberry Ventures > Collaborative Fund > Encourage Capital > S2G Ventures > 3x5 Partners > Advantage Capital
 Seattle Food Tech	Plant based meat	Pre-seed; \$2.1M		<ul style="list-style-type: none"> > VegInvest > Liquid 2 Ventures > UP Honest > Sinai Ventures > Y Combinator > Blue Horizon Equity > Kyle Vogt > Tamar Capital