

# Financial Models for Sustainable Maritime Development

Extending the *Ecosystem* Metaphor

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# Agenda

- Scoping financing gaps in sustainable maritime development
- Ecosystems and financing models
- Building an ecosystem: The case of fishery supply-chains
- Capital market financing continuum
- Financing quadrants: Balancing risk and scale
- Demand-side dynamics
- Supply-side dynamics: Maritime-themed sources
- Case examples
  - Hybrid – PPP, combined government, donor, private equity / impact
  - Debt – Municipal green bonds
  - Equity – Impact vs private equity
- Concluding Observations



# Definitions, challenges, and scope

- **Ecosystem (NOUN)**

*Ecology*

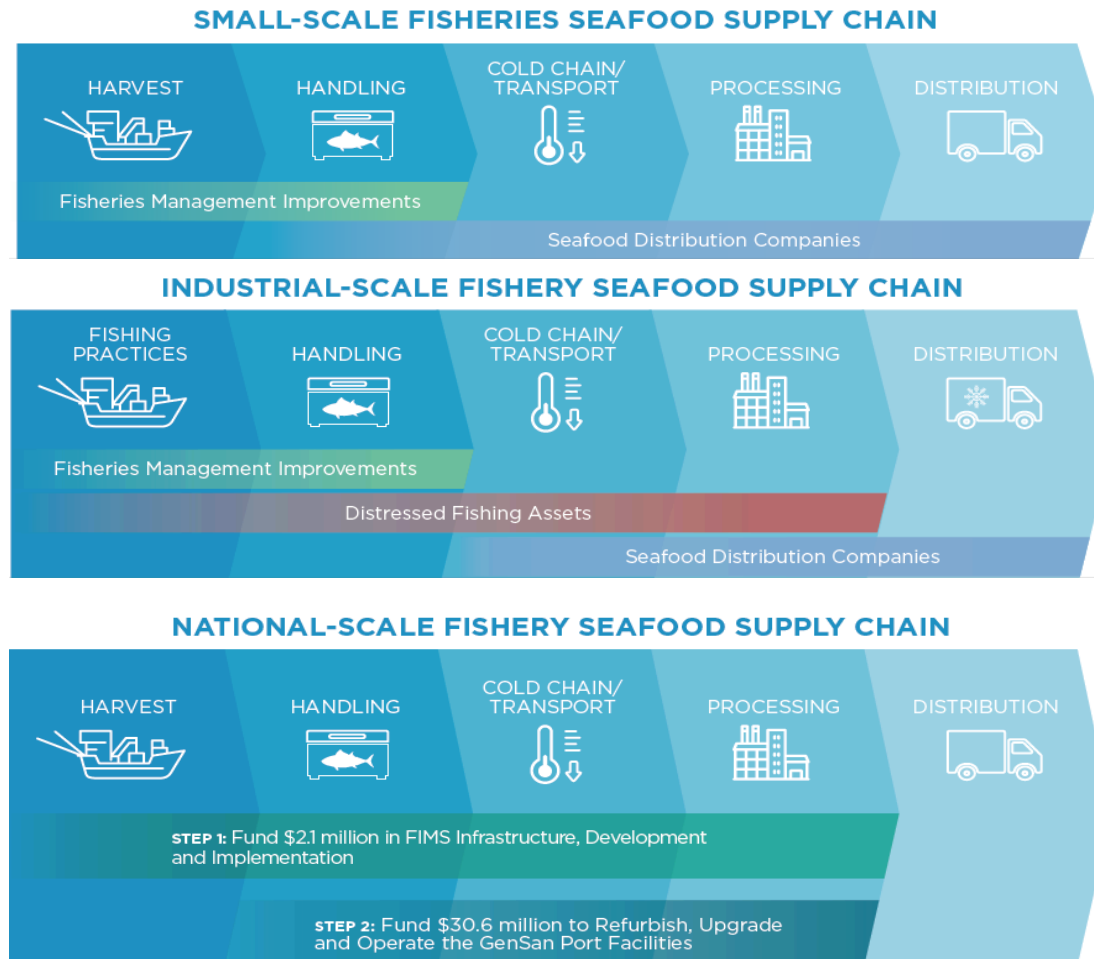
*1 A biological community of interacting organisms and their physical environment.*

*1.1 A complex network or interconnected system.*

- Effective – and sustainable – maritime development involves *at least* three well-integrated ecosystems: Marine / aquatic, commercial / industrial, financial
- *Stability and sustainability* are fundamental to the continuing viability of *each* ecosystem
- Financial markets represent institutionalized platforms to raise long-term risk capital
- Risk-bearing and scale are key components to financial market development and essential to efficient capital allocation
- The challenge...and our scope: Identify and develop robust *capital market* solutions to support the scaled build-out of sustainable maritime resources

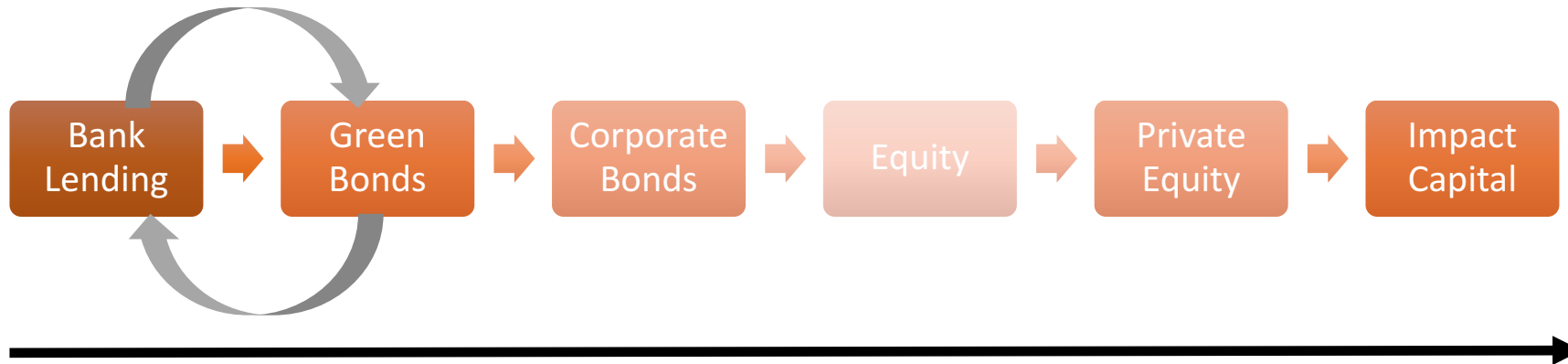


# Building an ecosystem: The case of nested fishery supply-chains



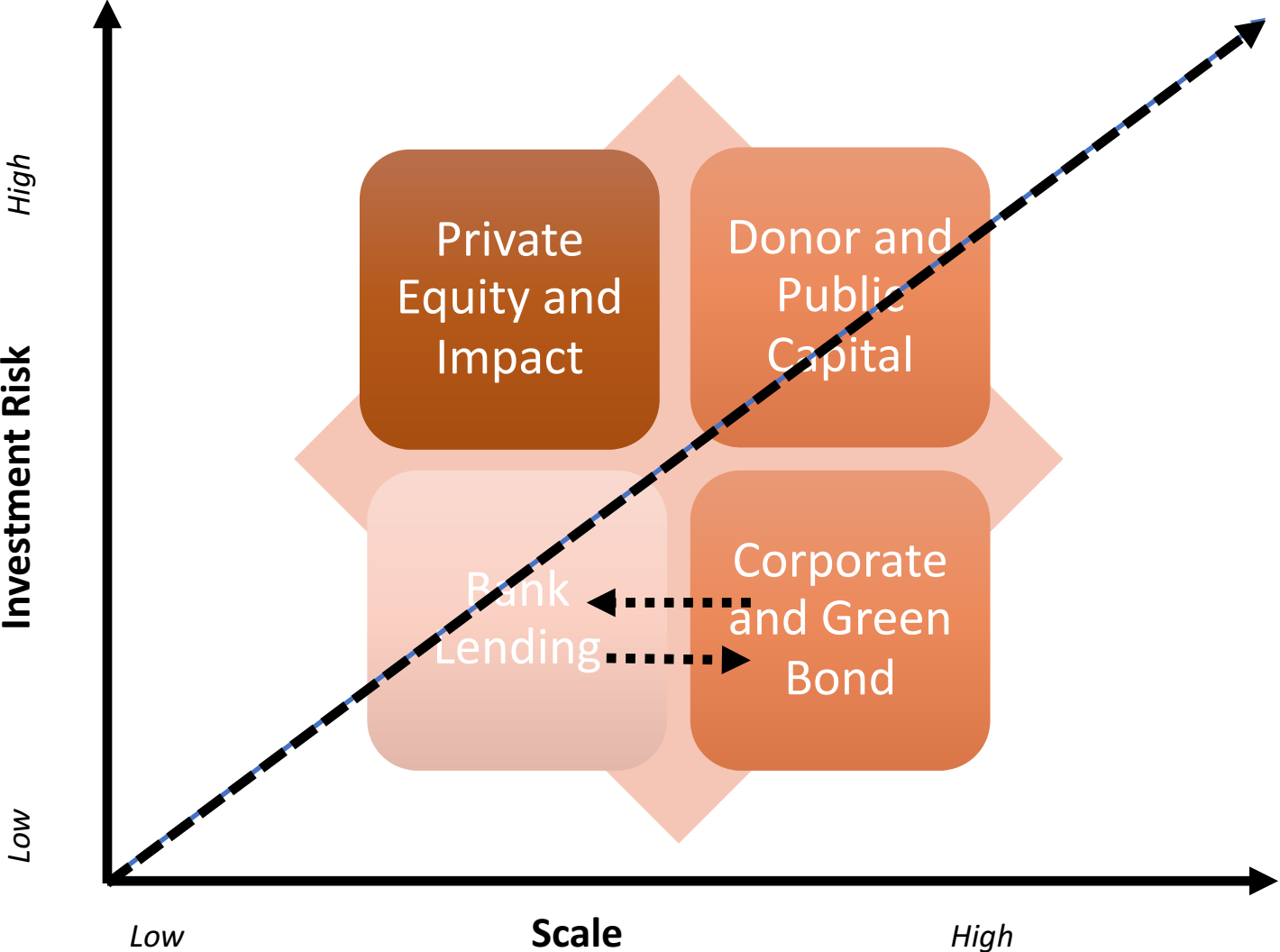
- Commercial ecosystem or cluster built from local base
- Few firms are vertically integrated
- Industry segmentation places high dependency on efficiency of ecosystem to *source, transport, process, and distribute perishable product*
- Key functions of government: Provide critical infrastructure, lead resource management to promote sustainable practices, facilitate industrial and financial scaling

# Capital market sustainable finance continuum

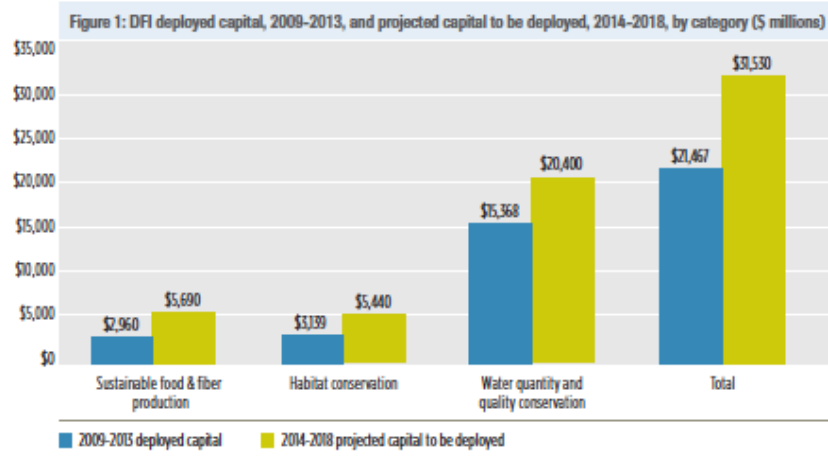


- Sources of capital generally conform to a wide continuum as a function of scale and investment risk
- Span credit (bonds, loans) to various types of both public and private equity
- Sources are **extensible** and can be **designed into complex capital structures**
- **Sustainability** themes/criteria offer **unique differentiator** with appeal to investor with "green" mandates", requirement for *demonstrable or verifiable* "dual" returns

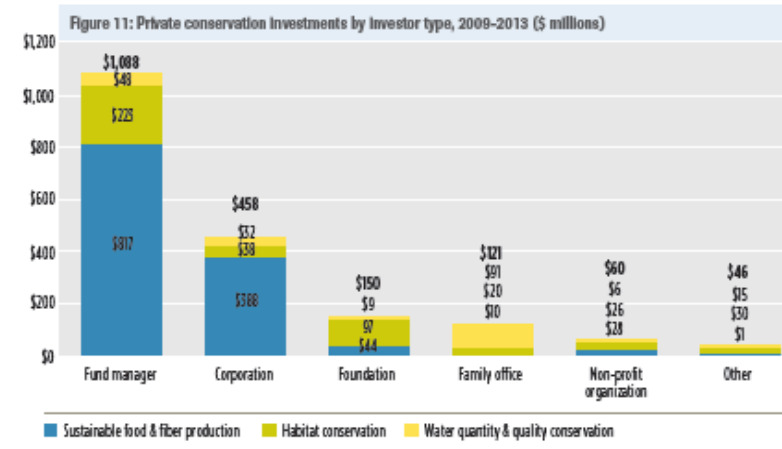
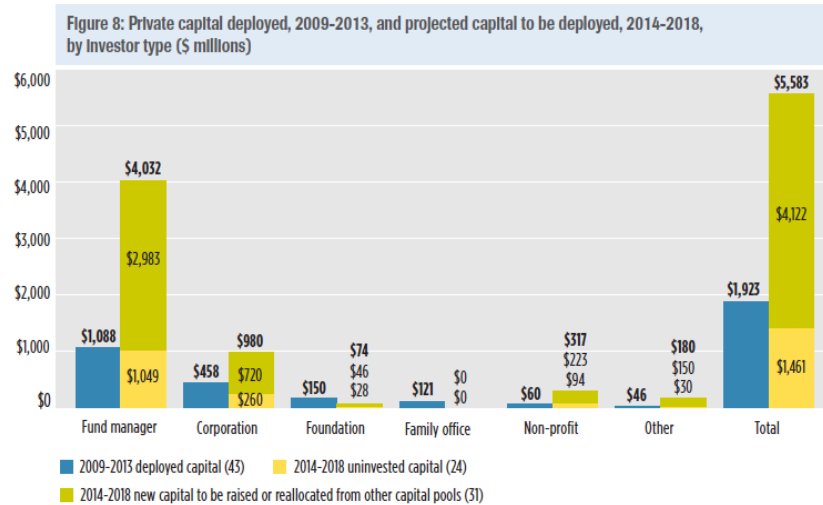
# Funding quadrants and capital sourcing: Investment risk vs scale



# Scale of investment – DFI vs private sector



4 respondents provided data. Source: ENVI/TMC



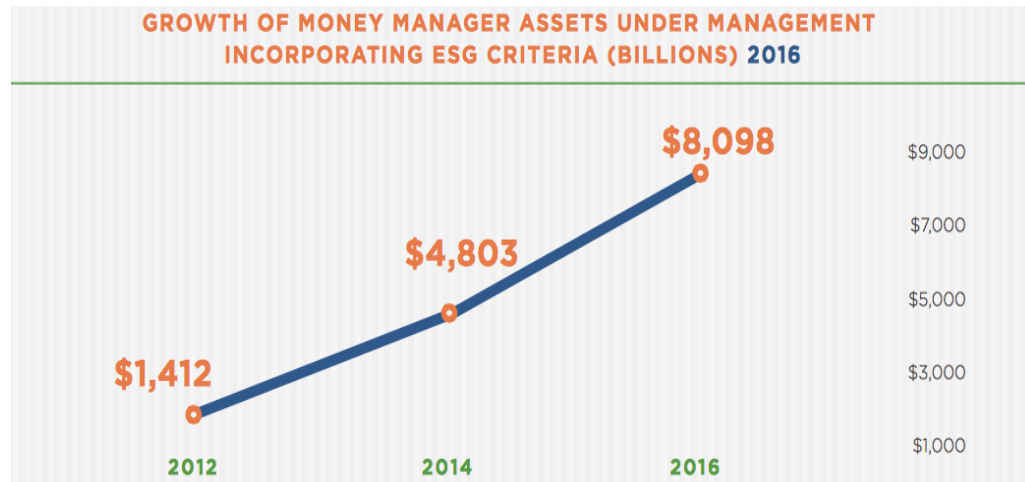
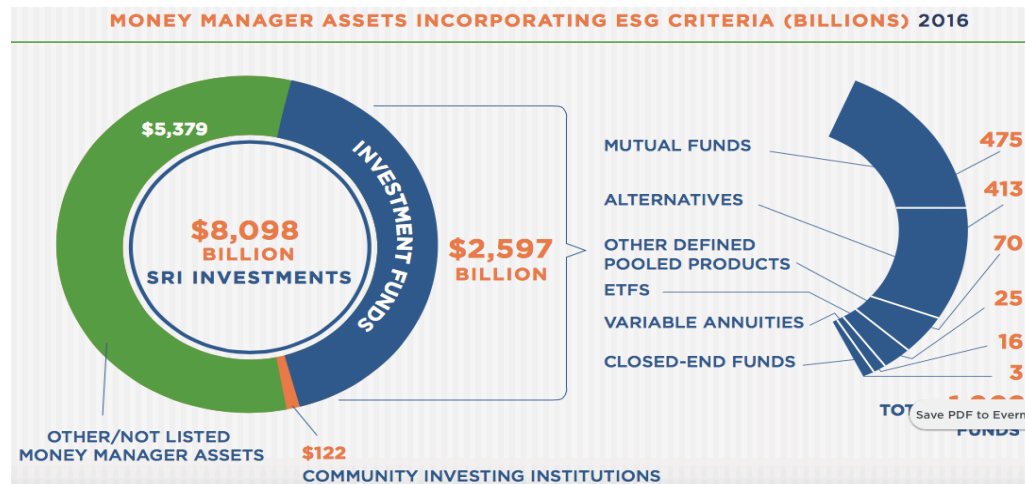
43 respondents provided data. Total reported investments: \$1.9 billion  
Source: ENVI/TMC

- Development finance institutions (DFI) have dominated investment in sustainable assets
- Fund managers lead as source of private capital deployed
- Rate of growth of private capital expected to increase and especially among institutional managers and corporations



# Sources of demand for “green” assets

Source: USSIF



- Sources of demand for green assets driven by dramatic increase in sustainability-themed mandates between 2012 – 2016
- Estimated 5x increase – from \$1.4T to \$8T - among asset owners and investment institutions, including institutional and mutual fund products

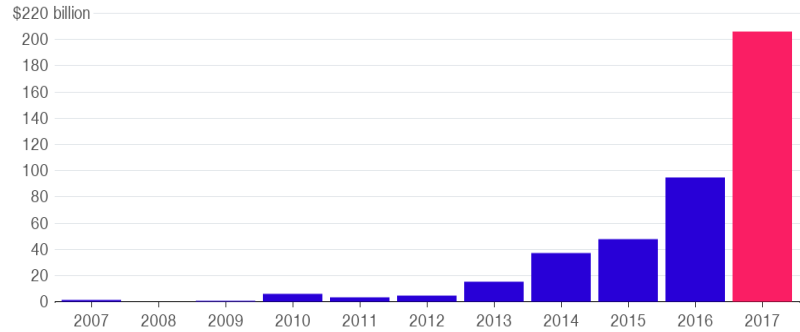




# The supply-side: Green bonds, loans

## Green Bond Boom

The market is expected to double in size again in 2017, according to Moody's



Source: Data from Bloomberg New Energy Finance, 2017 projection from Moody's

Bloomberg

Corporate issuances per sector 2014 - 2015 (in US\$bn)

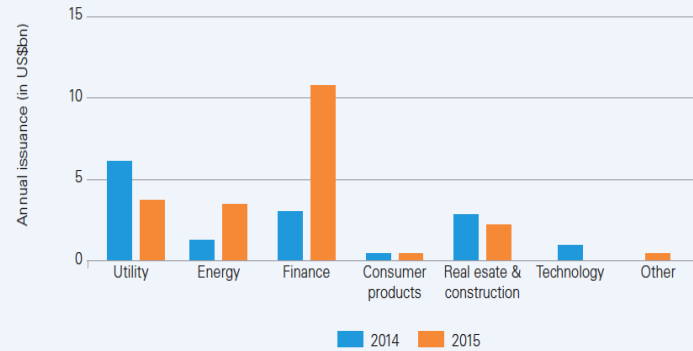
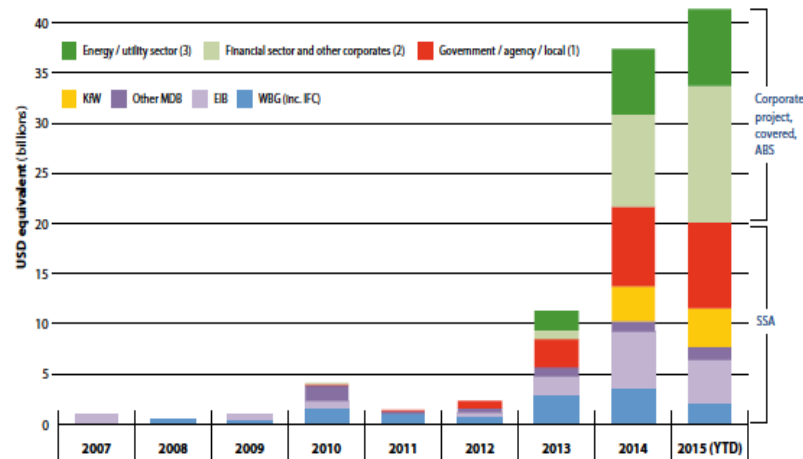


Figure 2: Composition of the green bond market (as of November 2015, USD Bn, gross issuance)



- New issuance market growing at 20% per year on strong demand
- Financial, utility, and energy companies among lead issuers
- Represent either a direct or an indirect source of capital (on-lent by bank issuers)
- Disclosure and reporting required against discrete issuing criteria




# Green bond types

- Use of proceeds
  - Based on credit quality of issuer
  - Defined by qualified use of proceeds
- Asset-backed
  - Based on credit quality of assets in bond portfolio
  - Structured from qualifying assets
- Project bonds
  - Based on credit quality of project cash flows
  - Defined by qualifying project criteria
- Pure-play
  - Based on the qualifying criteria of corporate business model



# Appropriate maritime uses of green bond proceeds

Climate Bonds Taxonomy					Climate Bonds <small>INITIATIVE</small>		
ENERGY	TRANSPORT	WATER	LOW CARBON BUILDINGS	INFORMATION TECHNOLOGY & COMMUNICATIONS	WASTE & POLLUTION CONTROL	NATURE BASED ASSETS	INDUSTRY & ENERGY-INTENSIVE COMMERCIAL
Solar	Rail	Built (grey) infrastructure	Residential	Power management	Recycling	Agricultural land	Manufacturing
Wind	Vehicles	Green and hybrid infrastructure	Commercial	Broadband	Other Recovery	Forests (managed and unmanaged)	Energy efficiency processes
Geothermal	Mass transit		Retrofit	Resource efficiency	Disposal	Wetlands	Energy efficiency products
Hydropower	Bus rapid transport		Products for building carbon efficiency	Teleconferencing	Prevention	Degraded Lands	Retail and wholesale
Bioenergy	Water-bourne transport				Reuse	Other land uses (managed and unmanaged)	Data centres
Wave and Tidal	Alternative fuel infrastructure				Pollution Control	Fisheries and aquaculture	Process & fugitive emissions
Energy distribution & management						Coastal infrastructure	Energy efficient appliances
Dedicated transmission						Land Remediation	Combined heat & power



**Climate Bond Certified**

● Certification Criteria approved  
● Criteria under development  
● Due to commence



# Green bond criteria: Case of marine renewable energy

Assets	Example eligible assets*	Mitigation	A&R
<b>Offshore wind</b>			
Assets that operate or are under construction to operate:	Offshore wind energy generation facilities	●	●
	Dedicated transmission infrastructure and support facilities (e.g. transformers, backbone, transmission terminus, grid connections, dedicated facilities for support vessels and vehicles, equipment storage, onshore assembly)	●	●
	Dedicated operational production or manufacturing or distribution facilities for key components, such as wind turbines, platforms etc.	●	●
<b>Tidal power; range and stream</b>			
Assets that operate or are under construction to operate:	Tidal energy generation facilities (e.g. turbine housing, turbines, causeway)	●	●
	Dedicated transmission infrastructure and support facilities (e.g. transformers, backbone, transmission terminus, grid connections, dedicated facilities for support vessels and vehicles, equipment storage, onshore assembly)	●	●
	Dedicated operational production or manufacturing or distribution facilities for key components	●	●
<b>Wave</b>			
Assets that operate or are under construction to operate:	Wave energy generation facilities (e.g. floating attenuators, point absorbers, overtopping / reservoir technologies, oscillating water columns)	●	●
	Dedicated transmission infrastructure and support facilities (e.g. transformers, backbone, transmission terminus, grid connections, dedicated facilities for support vessels and vehicles, equipment storage, onshore assembly)	●	●
	Dedicated operational production or manufacturing or distribution facilities for key components	●	●
<b>Other – using ocean current, river current, ocean thermals, salinity gradients etc</b>			
Assets that operate or are under construction to operate:	Energy generation facilities	●	●
	Dedicated transmission infrastructure and support facilities (e.g. transformers, backbone, transmission terminus, grid connections, dedicated facilities for support vessels and vehicles, equipment storage, onshore assembly)	●	●
	Dedicated operational production or manufacturing or distribution facilities for key components	●	●

- Location and size, including description of marine and coastal ecosystem and noting whether in marine protected areas or vulnerable marine ecosystems;
- Projected lifespan of the asset / project;
- Key stakeholders involved, including other users of the area and surrounding area;
- Project activities including details on installation, operation and decommissioning activities;
- Expected / current facility capacity and generation during / after life of the bond;
- Where the energy generated is being fed into, and estimated impact on grid mix;
- Projected avoided GHG emissions compared to fossil fuel counterfactual;
- Various standards, regulations project has been required to comply with.



## Case 1: New Bedford Marine Commerce Terminal...again

- Integrated terminal platform designed to support offshore energy development
- Represents significant government investment in marine infrastructure
- Financed in part through green bond issuance as one of several named projects
- State of MA green bonds issued as first green municipals; followed by subsequent issuances in Massachusetts and other US state (e.g. California...)
- “Use of proceeds” bond; reflects credit risk of State of MA
- Represents a key innovation in sub-sovereign issuance of green bonds



# The supply-side: Equity, private equity, impact

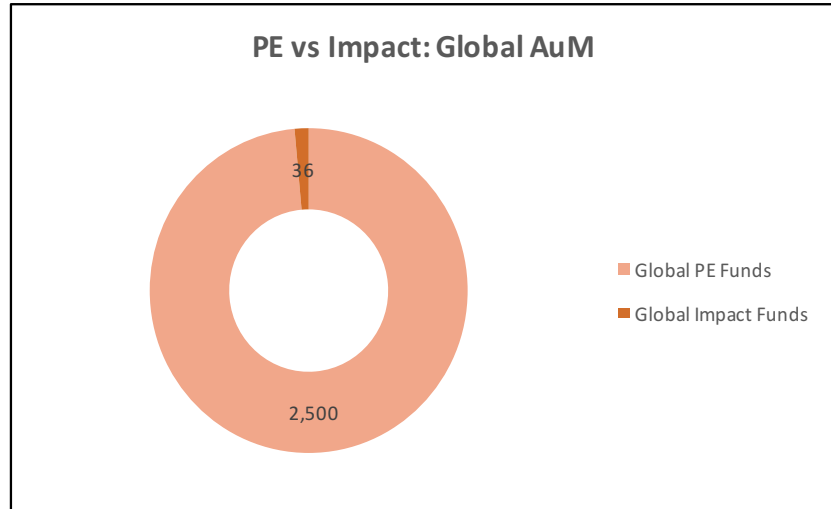
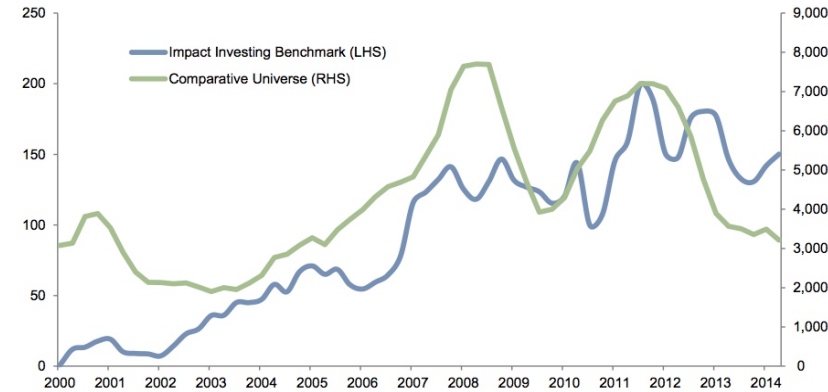


Figure 1. Capital Invested: Four-Quarter Rolling Average  
As of June 30, 2014 • Paid-in Capital (US\$ millions)



Source: Cambridge Associates LLC Private Investments Database.  
Notes: Calculations are based on rolling averages of quarterly paid-in capital, beginning with the first cash flow for the Impact Benchmark in second quarter 1999. This chart represents all funds in each respective sample with vintage years 1998–2010.

Table 3. Sector and Geographic Focus  
As of June 30, 2014

By sector	Impact Benchmark n = 51, Total fund assets = \$6.4bn		Comparative Universe n = 705, Total fund assets = \$293.0bn	
	# Funds	% Capitalization	# Funds	% Capitalization
Multi Industry	34	67.7%	682	98.3%
Business Services		1.1%		0.0%
Financial Services	10	26.8%		0.1%
Information Technology*		3.6%		--
Consumer/Retail	3	3.3%	22	1.6%
By geography	# Funds	% Capitalization	# Funds	% Capitalization
Africa	11	51.2%	20	1.0%
Asia/Pacific-Emerging	4	2.6%	128	16.6%
Canada		0.0%	4	0.2%
Europe-Developed		3.1%	45	4.4%
Europe-Emerging		0.2%	4	0.2%
Global-Emerging	10	6.2%	12	4.9%
Latin America & Caribbean	6	2.0%	12	0.6%
Middle East-Emerging		0.2%	8	0.4%
US	15	34.5%	472	71.8%

Note: This report does not show characteristics for groupings of fewer than three funds to protect manager confidentiality.

\* IT was left out of the comparative universe; it would have constituted a large portion of the universe, while very few impact funds allocate exclusively to IT. Only the industries listed above were included in the comparative universe.

- Impact: Investments made into companies, organizations, and funds with the intention to generate social and environmental impact alongside a financial return (GIIN)
- Scale differentiates PE from impact
- Global private equity AuM over approximately \$2.5T; global impact \$36B (GIIN)
- While average fund, deal size larger for PE
- ...functional distinctions are shrinking



# Representative maritime equity, private equity, impact transactions

Target	Country	Sector	Type	Amount	Year	Partner
Aruna	Indonesia	B2B online lending for fishermen	Seed		2016	
Catalina Sea Ranch	US	Aquaculture	Seed	\$ 1.83	2016	
Catalina Sea Ranch	US	Aquaculture	Follow-on	\$ 2.00	2017	
eFishery	Indonesia	Smart fish feeder	Pre-serie A PE		2015	Aqua-Spark, Ideosource
The Yield	Australia	Aquaculture sensors	Early stage	\$ 2.50	2016	Bosch
Yuehao Feed Group	China	Fish feed for aquaculture	Private equity		2015	KKR
Calysta	US	Alternative feed ingredient	Series D	\$ 40.00	2017	Mitsui, Temasek,
Andromeda	Greece	Aquaculture, processing	PE transfer		2016	Amerra Capital
Apex Frozen Foods	India	Frozen food exporter	IPO		2017	
Agro Capital	Malaysia	Aquaculture	IPO via RTO		2015	
Seaprodex	Vietnam	Fishing, aquaculture, processing	Privatization via IPO		2014	
Hofseth BioCare	Norway	Biomarine	PIPE	\$ 7.00	2015	Bonafides
Phu Cuong - Soc Trang	Vietnam	Wind farm	Project	\$ 436.00	2014	
Storvik Aqua	Norway	Aquaculture equipment	Sale	\$ 5.90	2016	Vard (Sing)
Icicle Holdings	US	Seafood processing	Sale		2015	Convergence (Indo), Dominion
Paseco	Vietnam	Aqua products	Sale	\$ 0.76	2017	Millenlium Global (Phil)

- Capital for sustainable maritime projects **sourced across the equity spectrum**
- Equity drawn to all areas – within and across - the marine ecosystem
- Capital for early stage private equity sourced from *both* **impact and niche PE funds...**
- Capital sources expanding as **demarcations between impact and PE narrow with scale**



## Case 2: A Tale of Two Funds - AquaSmart and Bonafides

### AquaSmart

- Global investment fund based in Utrecht, the Netherlands
- Invests in sustainable aquaculture businesses through SMEs that generate investment returns, while creating positive social and environmental impact
- Typically invests between €250,000 to €5,000,000 per deal
- Target AuM \$10-\$25 M
- Representative deals:
  - Calysta – CA fish meal substitute
  - Chicoa Fish Farm – Mozambique-base fish farming operation

### Bonafide

- International investment and research
- Focuses exclusively on sustainable fisheries and aquaculture and related value chain
- Bonafide Global Fish Fund – \$150M open end fund that invests in equities and securities of companies in the "fish" value chain
- In 2015 launched a PE vehicle - Deep Blue Ventures with commitments from pensions, family offices, and HNW
- Commits \$5-20M under Bonafide or \$.5 – 10 M under Deep Blue
- Representative deal: Hofseth BioCare





# Hybrid Models: Public Private Partnership (P3)

Sources: World Bank

- No single, standard definition
- Combine skills and resources of both public and private sectors through allocation of risks and responsibilities
- Enable governments to leverage expertise and resources of the private sector, to concentrate on policy, planning, regulation, resource management, to delegate operational activities to those best suited to management them
- In financial modeling
  - Facilitates efficient allocation of risk
  - Allows government financial institutions to *catalyze* – vs crowd-out – private capital
  - Permits scale economies particularly for large maritime infrastructure projects, but...
- Not necessarily scale dependent



# Case 3: A Tale of Two Small-Scale Fishery Strategies

Source: encourage capital

	THE MARISCOS STRATEGY	THE ISDA STRATEGY
Country	Chile	The Philippines
Proposed Investment	\$7.0 million	\$11.7 million
Financing Structure	50% equity, 25% foundation grant, 25% government grant	74% equity, 26% foundation grant
Investment Term	5 Years	10 Years
Fishery/Species Focus	Razor clams, scallops, stone crab, king crab, nylon shrimp, abalone, and mussels	At least 20 species, including tuna, mahi mahi, snapper, mackerel, lobster, octopus, squid, crab, and sea urchin
Core Investments	<ul style="list-style-type: none"> <li>• Fishery management improvements</li> <li>• Seafood processing company</li> </ul>	<ul style="list-style-type: none"> <li>• Fishery management improvements</li> <li>• Seafood processing company</li> </ul>
Number of Fishing Communities	7	40 initially, up to 80
Number of Fishers Engaged	550	19,000
Targeted Impact Returns: Protecting and Restoring Fish Stocks	<ul style="list-style-type: none"> <li>• Protect existing biomass from overfishing with potential upside increase of 10%</li> <li>• Pay a premium of 25% to market prices for raw materials sourced, increasing aggregate fisher income by \$1.8 million<sup>17</sup> over the investment period</li> </ul>	<ul style="list-style-type: none"> <li>• Protect existing biomass from overfishing with potential upside increase of 20%</li> <li>• Pay a premium of 15% to market prices for raw materials sourced, increasing aggregate fisher income by \$11.9 million<sup>19</sup> over the investment period</li> </ul>
Targeted Impact Returns: Supporting Fishing Livelihoods	<ul style="list-style-type: none"> <li>• Establish and fund a Fishing Community Trust</li> </ul>	<ul style="list-style-type: none"> <li>• Establish and fund a Fishing Community Trust</li> <li>• Safeguards the supply of 6.7 million seafood meals annually</li> </ul>
Targeted Impact Returns: Feeding More People	<ul style="list-style-type: none"> <li>• Safeguards the supply of 5 million seafood meals annually</li> <li>• Increases meals to market through 13.5% reduction in spoilage, delivering an additional 150,000 seafood meals to consumers annually</li> </ul>	<ul style="list-style-type: none"> <li>• Increases meals to market through a 13% reduction in spoilage in the supply chain, delivering an additional 800,000 meals to consumers annually</li> </ul>
Projected Financial Returns	<ul style="list-style-type: none"> <li>• Targets 11.1% unlevered equity return with exit sale to strategic buyer</li> </ul>	<ul style="list-style-type: none"> <li>• Targets 20.7% unlevered equity return with exit sale to strategic buyer</li> </ul>

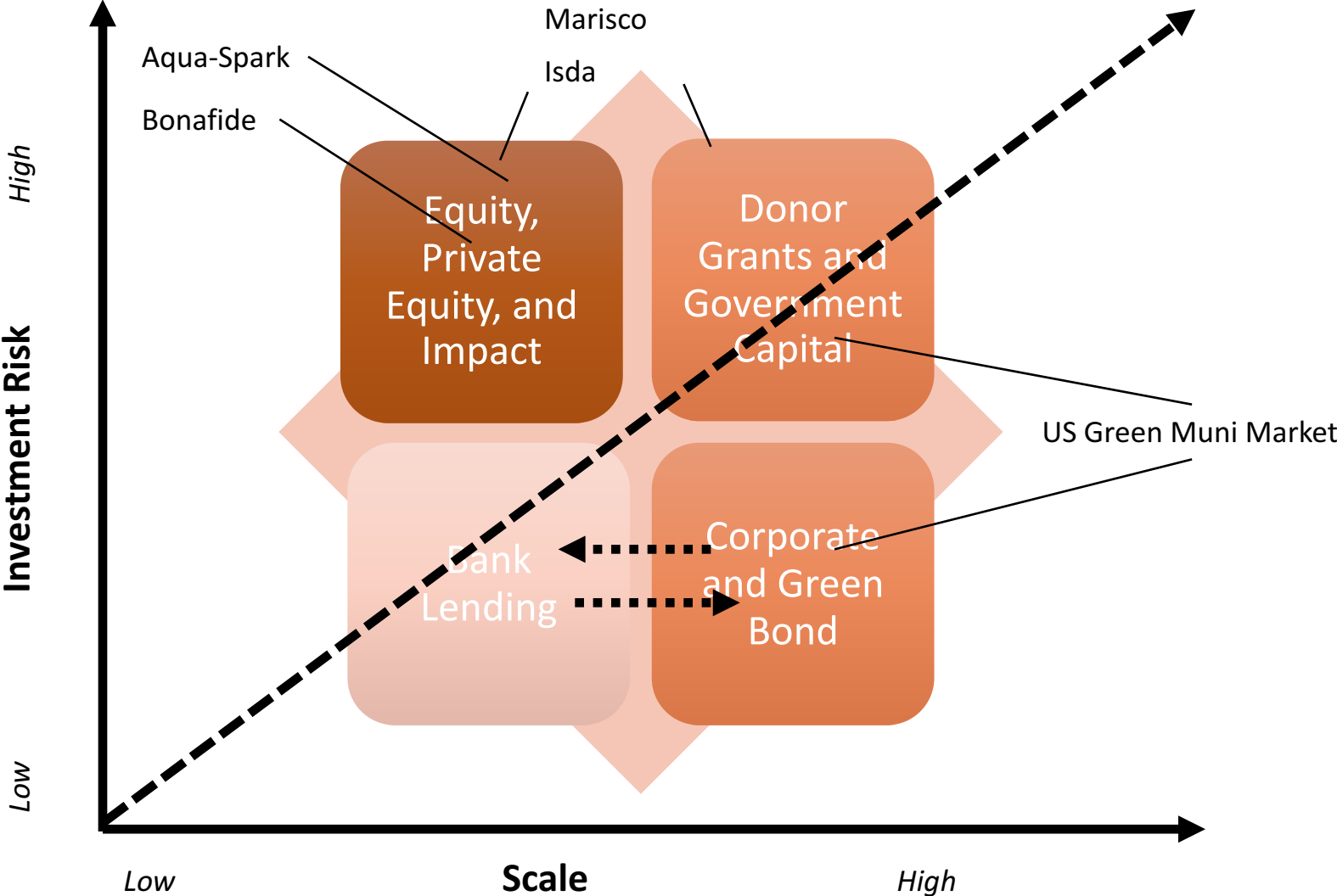


## *Hypothetical Case 4: Taiwan's Green Energy Plan*

- MoEA's 8 year new energy development plan to phase out nuclear sources
- Target investment of \$22B to increase share of renewables from 4.8% to 20% of power mix by 2025
- Project may include several maritime elements, including
  - Marine technology park – Kaohsiung
  - Offshore wind turbine industry zones
- Project expected to "catalyze" as much as \$60B of private capital
- Project criteria warrant green bond consideration as a source of capital for the project
- Taiwan has been innovative in green finance
  - First Asian corporate green bond issued by RoC company – Advanced Semiconductor Engineering – in 2014
- CTBC Bank -中國信託銀行-, E. Sun Commercial Bank -玉山銀行-, KGI Bank -凱基銀行- and Bank SinoPac -永豐銀行- approved in 2017 to issue first green bonds in Taiwan totaling US\$171 million



# Funding quadrants...revisited



# Concluding observations

- Scale and risk are key determinant when sourcing capital for sustainable maritime development
- Investor interest in “sustainable” assets – across risk spectrum - is growing rapidly, but particularly among institutions
- Financial product development has lagged the acceleration of funding demand, but...
- ...capital market and deal structuring innovations – e.g. issuer diversity of green bonds - are expanding
- Additional reporting drives both transparency and accountability and both enhance marketability to institutional and HNW investors
- Hybrid financing structures – e.g. PPP, green bank loans – extend the financing ecosystem, as does the narrowing distinction between impact and sustainable PE mandates
- Scale and exit-targeting, in particular, differentiate the role PE when sourcing risk capital for maritime development



## Selected sources

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- “Sustainable Fisheries Financial Strategies”, EKO Asset Management Partners, 2014
- “Investing in Conservation: A Landscape Assessment of an Emerging Market, EKO Asset Management Partners, 2014
- “Sustainable Development Strategy for the Seas of East Asia”, 2015
- “Green Finance: The Next Driver of Real Growth?”, S&P Global, 2017
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- “Landmark transaction in the global shipping sector – first certified sustainable shipping loan”, ABN-Amro, 2016
- ISSIF
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- Climate bond criteria: Marine energy
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