


# Floating Wind Solutions

## A Realistic View on the Floating Wind Project Pipeline

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Organized by   Quest Offshore



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# Between Hype and Reality

A hype is a fundamental misconception of the market.

- Daily ever-bigger targets cross our media, supported by so-called 'forecasts' with a target year/benchmark.
- This 'top-down' data is **exploratory** and 'forecasts' are merely extrapolated projections based on **undefined data**.
- The forecasts only show possible 'market volumes' often not backed by actual project data.
- Basing our business decisions on these numbers imposes risk to be disappointed.

## International offshore wind: Floating offshore wind

31 jul 2023 — In the US, the Biden administration has set a FLOW target of 15GW by 2035, whilst the state of California aims to have at least 25GW of FLOW

## Offshore renewable energy

The strategy sets targets for an installed capacity of at least 60 GW of offshore wind and 1 GW of offshore solar energy by 2030, and 300 GW and 40 GW, respectively, by 2050. The EU, a...

## Europe can expect to have 10 GW of floating wind by 2030

2 jun 2022 — It is not unreasonable to expect that Europe will have over 10 GW of floating wind in operation by 2030. But targets don't automatically ...

## Offshore wind 2023: New ambitions! New challenges?

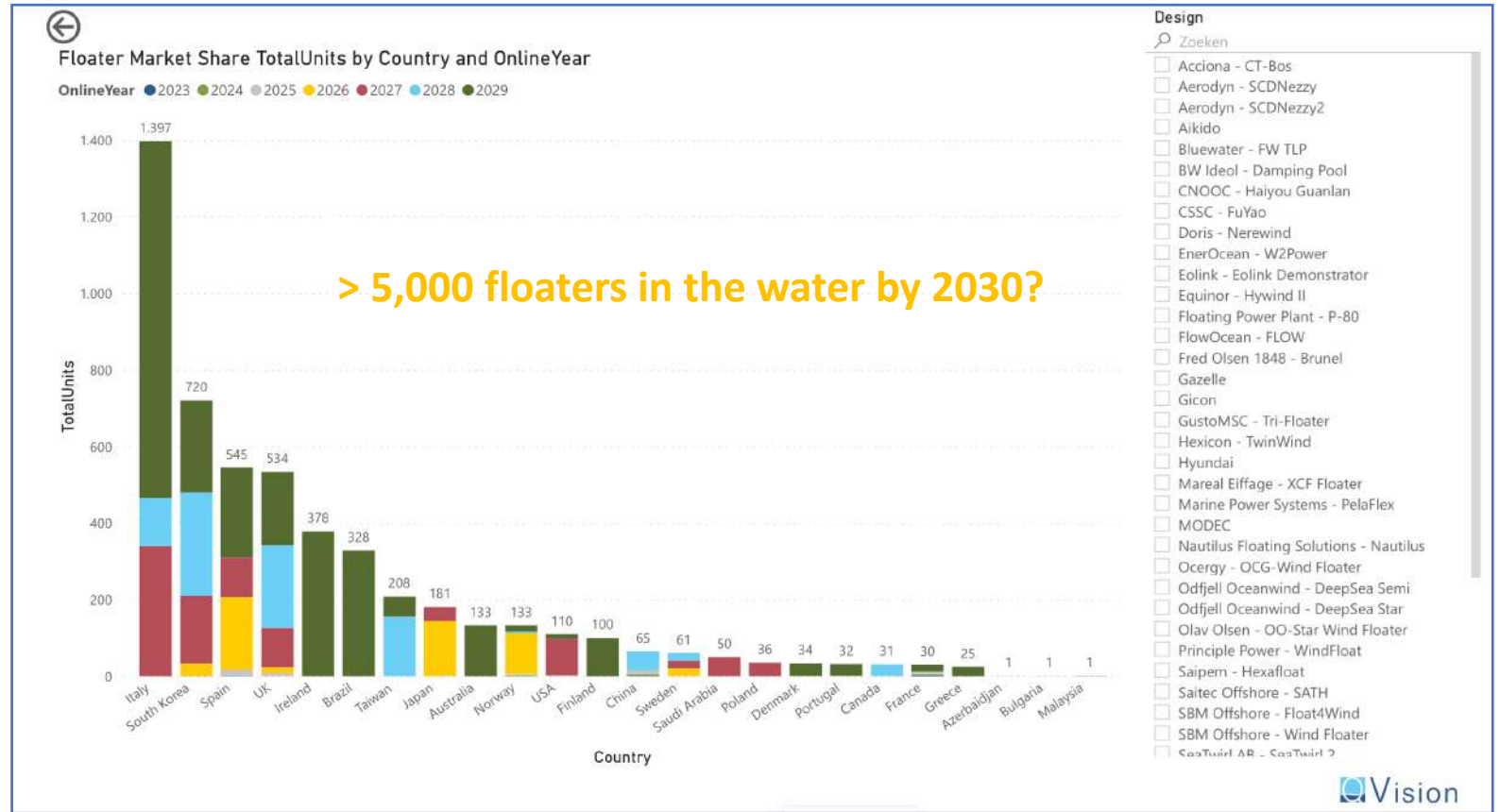
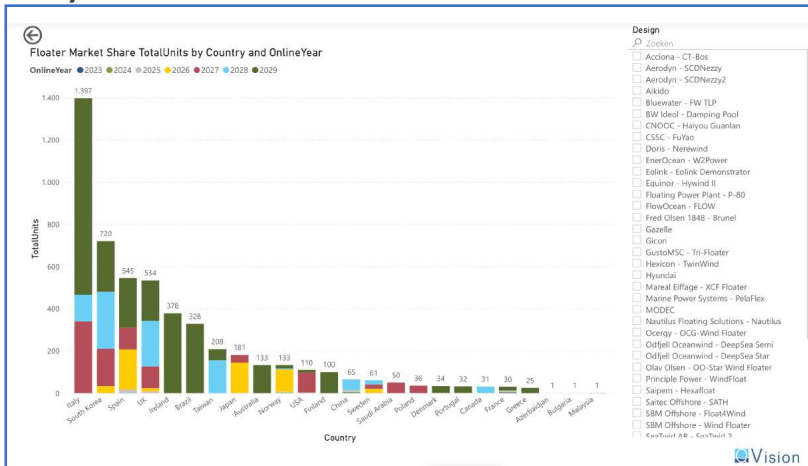
In total numbers the global target for the offshore wind sector is 2,000 GW by 2050. When you consider that the current 57 GW (2022) is only 3% of the 2050 target...

## Global Floating Wind on Path to Miss 2030 Targets, Report

...  
14 nov 2022 — According to the latest Global Floating Wind report, targets for 2030 wind production from floating, rather than fixed, wind farms ...

# Top-down GW forecasts hide complexity.

- GW/MW for market economics is fine.
- GW-volumes hide the complexity of producing large numbers of units.
- #Units per capacity or project better suits forecasting on project level.
- Top-down Global Forecast is 5,000 units by 2030?



- Design**
- Zoeken
- Acciona - CT-Bos
  - Aerodyn - SCDNezzy
  - Aerodyn - SCDNezzy2
  - Aikido
  - Bluewater - FW TLP
  - BW Ideol - Damping Pool
  - CNOOC - Haiyou Guanlan
  - CSSC - FuYao
  - Doris - Nerewind
  - EnerOcean - W2Power
  - Eolink - Eolink Demonstrator
  - Equinor - Hywind II
  - Floating Power Plant - P-80
  - FlowOcean - FLOW
  - Fred Olsen 1848 - Brunel
  - Gazelle
  - Gicon
  - GustoMSC - Tri-Floater
  - Hexicon - TwinWind
  - Hyundai
  - Mareal Eiffage - XCF Floater
  - Marine Power Systems - PelaFlex
  - MODEC
  - Nautilus Floating Solutions - Nautilus
  - Ocegy - OCG-Wind Floater
  - Odfjell Oceanwind - DeepSea Semi
  - Odfjell Oceanwind - DeepSea Star
  - Olav Olsen - OO-Star Wind Floater
  - Principle Power - WindFloat
  - Saipem - Hexafloat
  - Satec Offshore - SATH
  - SBM Offshore - Float4Wind
  - SBM Offshore - Wind Floater
  - CasTwin AR - CasTwin 2

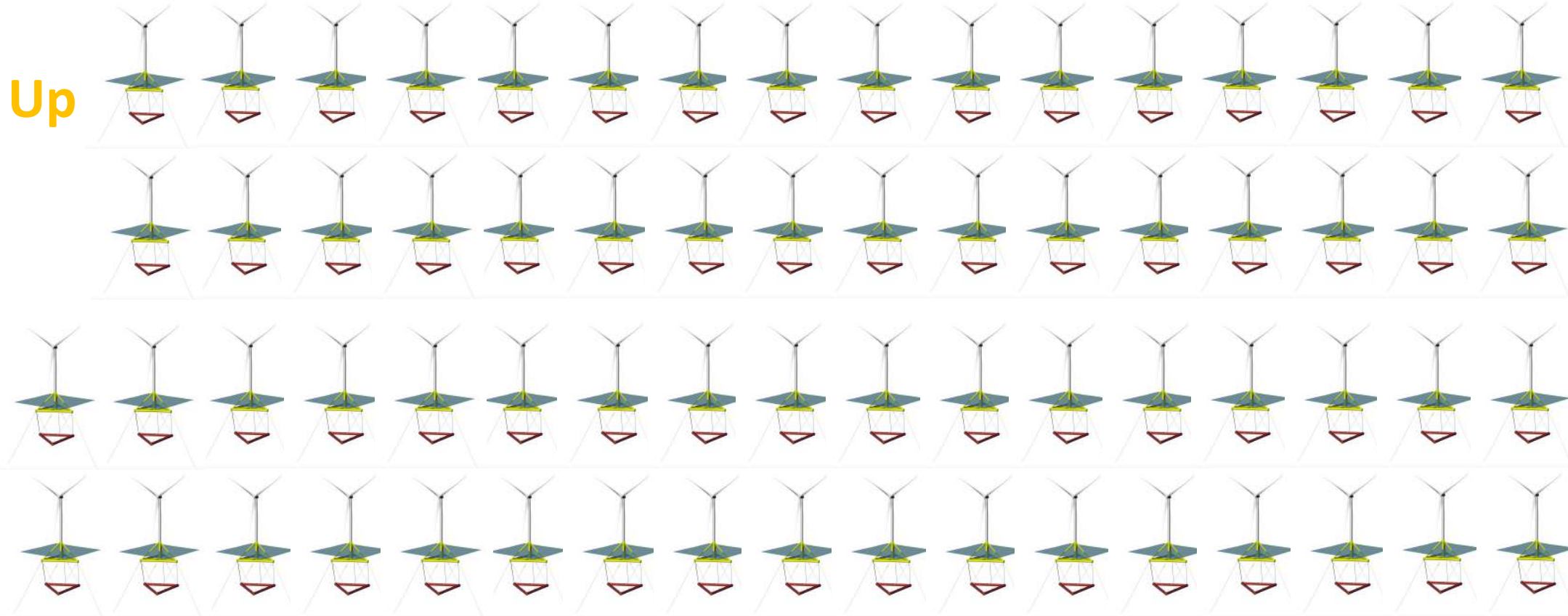


Top-down GW forecasts hide the complexity.

Top Down

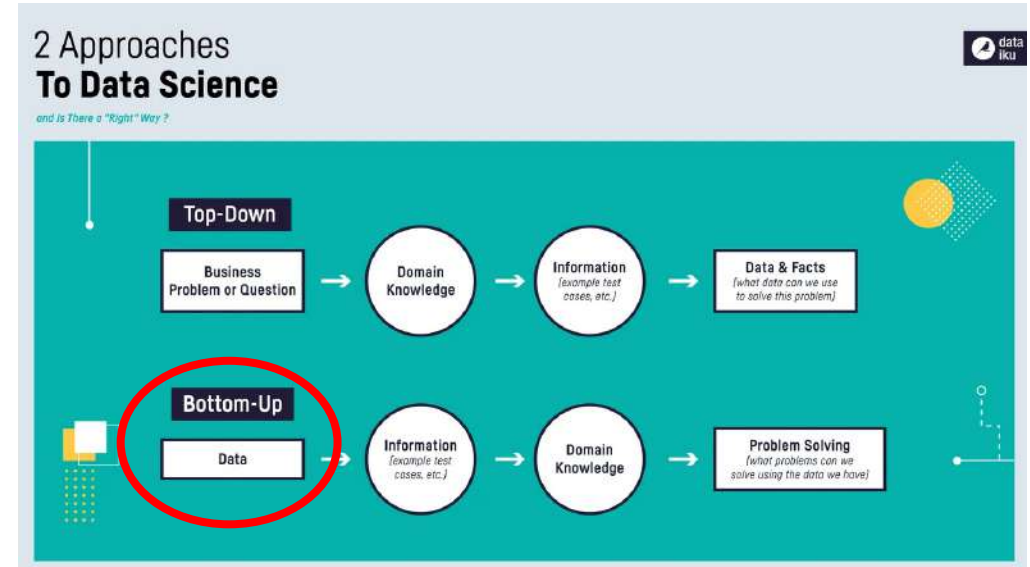
1 GW

Bottom Up



# Modeling data to increase reliability.

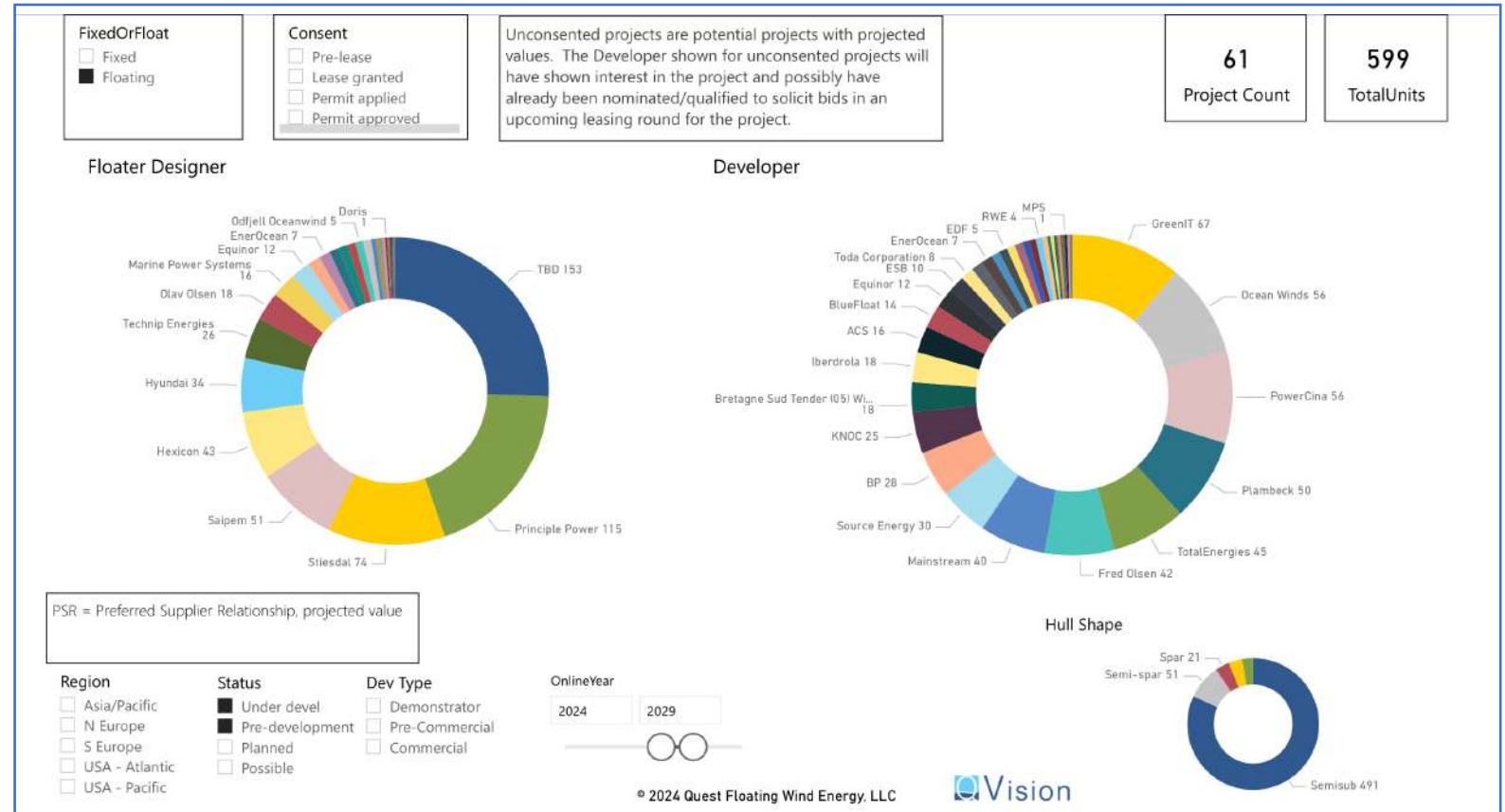
- A more reliable look into the future should be based on '**bottom-up**' data with the largest component possible of '**true**' information.
- The 'true' data component can be analyzed, structured and serve modeling to derive insights.
- Reliability can be built to control data up to defined reliability levels which then become the new benchmark in the model applied.



# Global Forecast 2030 (Bottom-up)

Total realistic #units forecasted for <2030

- Focus/filter on existing projects only (Under Dev. and Pre-Dev.).
- Focus on feasible #units to be fabricated (Max 50 units).
- Global Forecast for 2030 is 599 units (61 projects).
- Breakdown for Developer and Designer indicates biggest market players.
- Breakdown per region shows where the short-term market is.



# Global Forecast 2030 (Phase)

Status	Phase	TotalMW	TotalUnits	No.Projs
Pre-development	-	1,812	122	8
Pre-development	Surveys/Studies/FEED	766	61	5
Pre-development	Design	96	8	6
Under devel	-	901	49	7
Under devel	Surveys/Studies/FEED	1,528	119	7
Under devel	Design	2,373	158	18
Under devel	Pre-construction	751	59	3
Under devel	Construction	188	14	5
Under devel	Installation	22	9	2
<b>Totaal</b>		<b>8,437</b>	<b>599</b>	<b>61</b>

**61**  
Project Count

**8,437**  
TotalMW

**TotalMW by Phase**

**TotalUnits by Phase**

**Region**

- Asia/Pacific
- N Europe
- S Europe
- USA - Atlantic
- USA - Pacific

**FixedOrFloat**

- Fixed
- Floating

**DesignConf**

- Confirmed
- PSR
- Spec

**Status**

- Possible
- Planned
- Pre-development
- Under devel

**Phase**

- 
- Surveys/Studies/FEED
- Design
- Pre-construction
- Construction
- Installation

**Online Year**

2024 ————— 2029

○ ○

PSR = Preferred Supplier Relationship, projected value



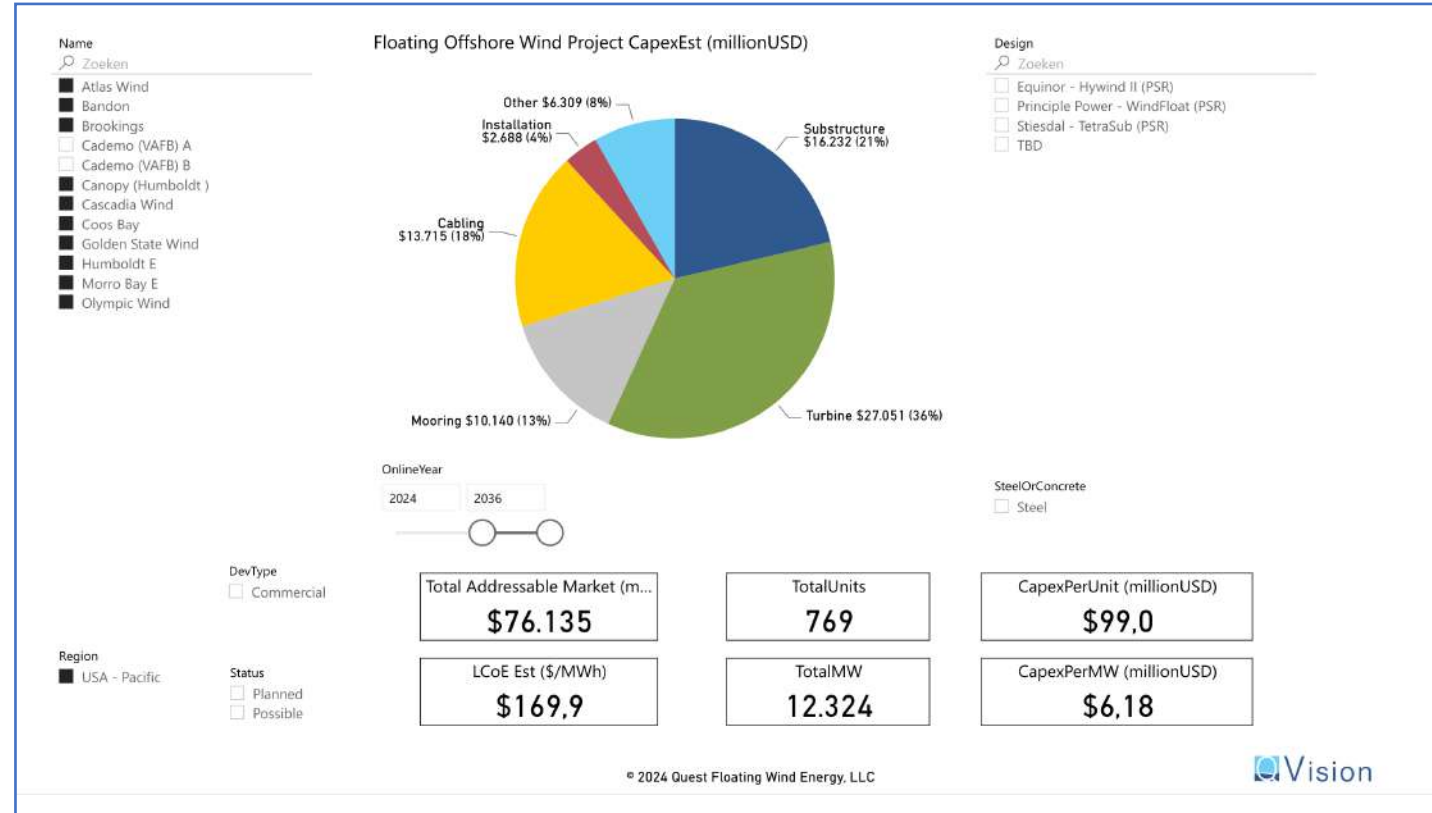
# USA West Coast



# California, Washington, Oregon

Total #units forecasted for <2030

- 10 Projects WD ~1,000-1,500m
- All fall within the new Strike-price
- Average LCoE \$169M/MWh
- CapEx/unit \$99M

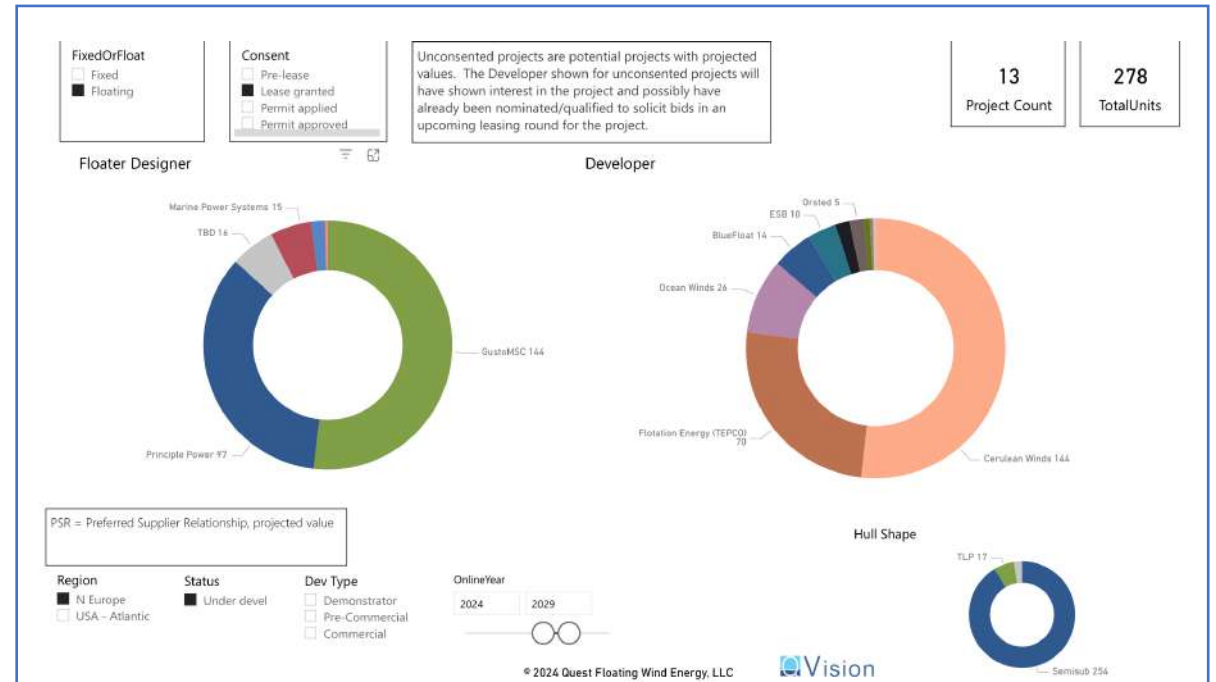
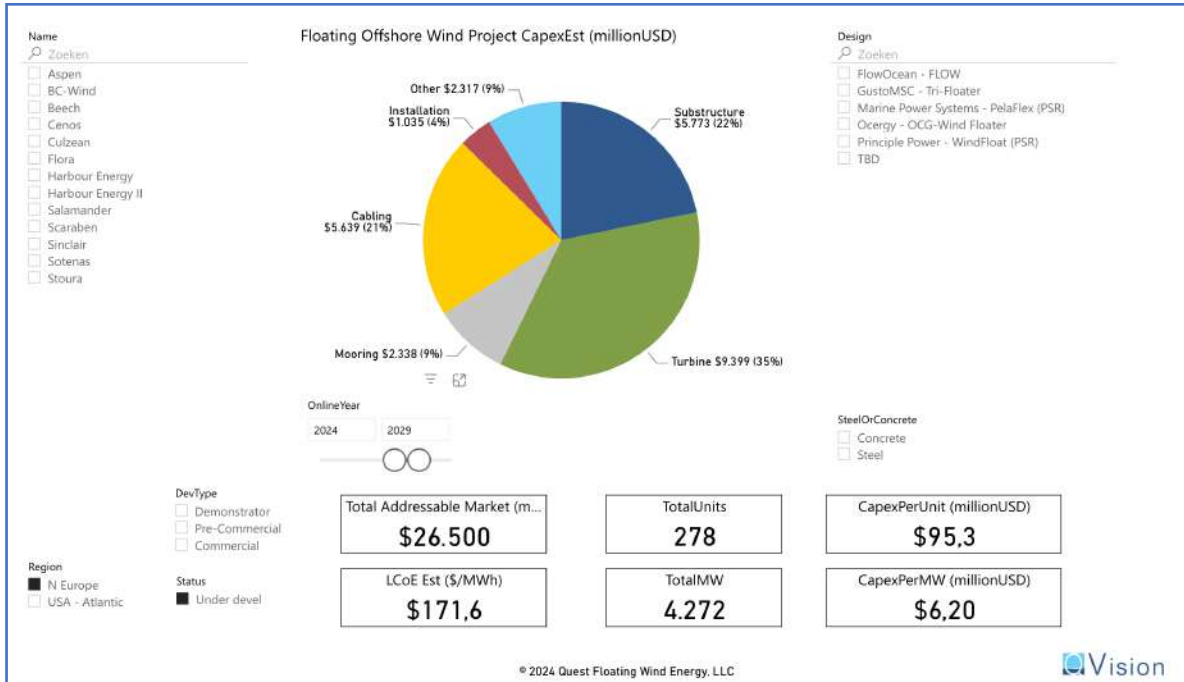


# Northern Europe

# Northern Europe *Under Development CapEx*

## Total #units forecasted for <2030

- 13 Projects WD
- Average LCoE \$172M/MWh
- Average unit cost is - \$95M

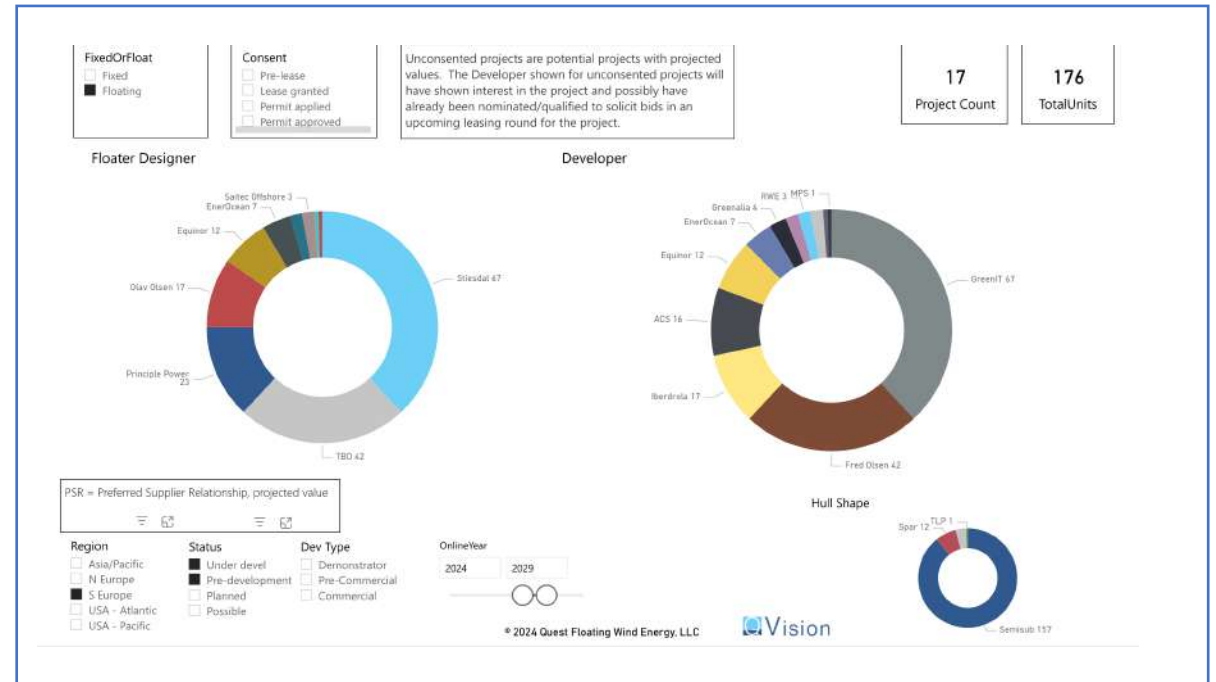
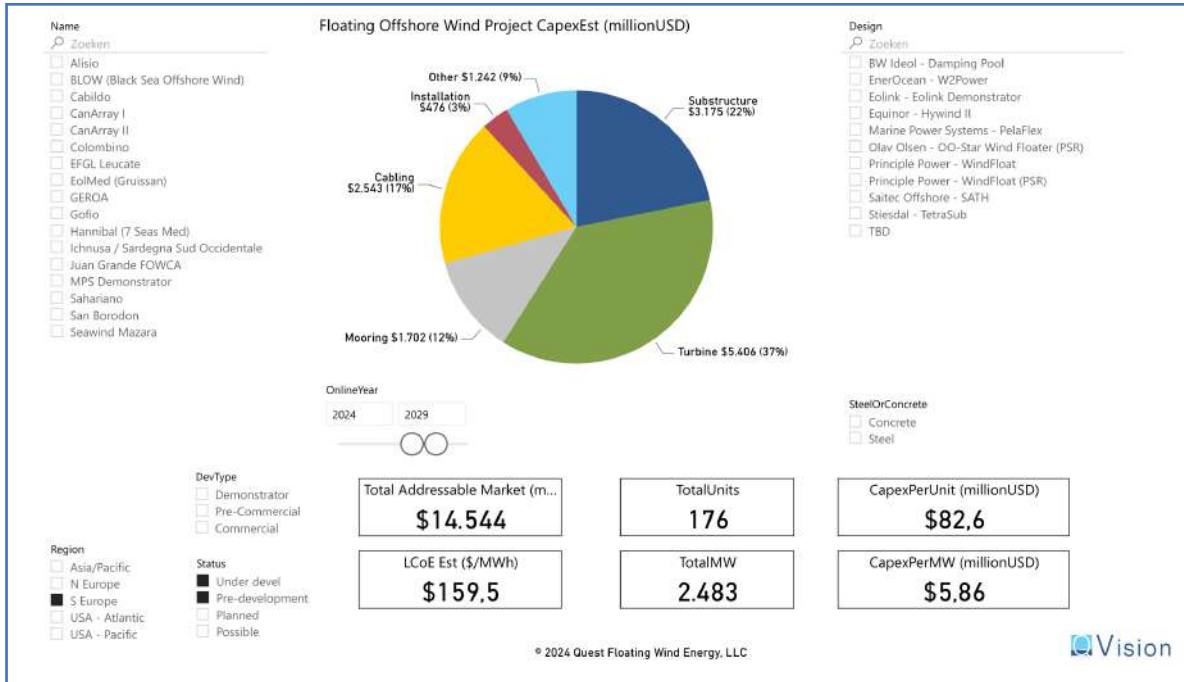


# Southern Europe

# Southern Europe *Under Development, Lease granted*

Total #units forecasted for <2030

- 2 Projects qualify
- Pre-dev. Projects (preferred qualified) included adds another 11 projects.
- Average LCoE \$160M / average unit - \$83M

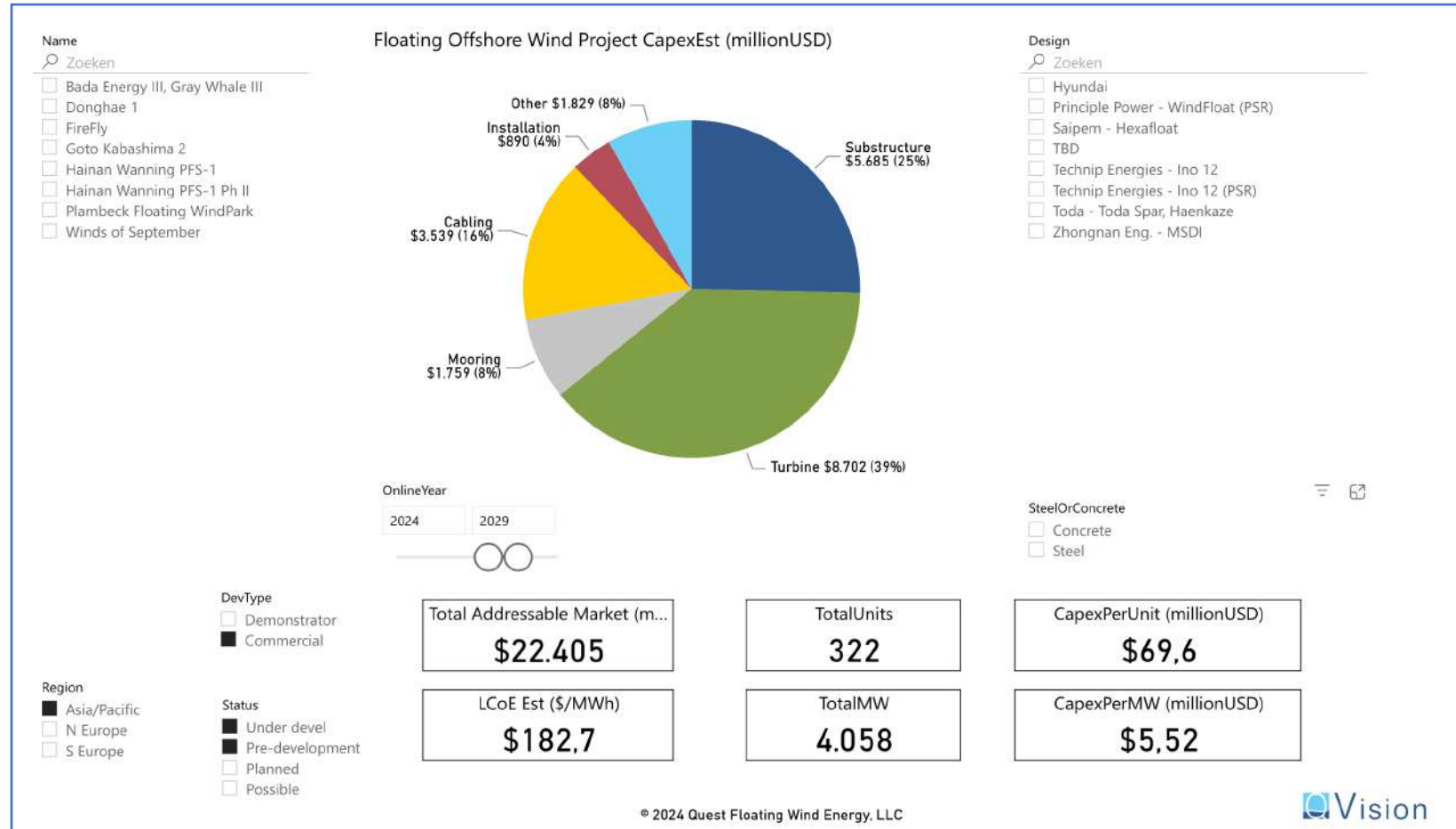


AustralAsia

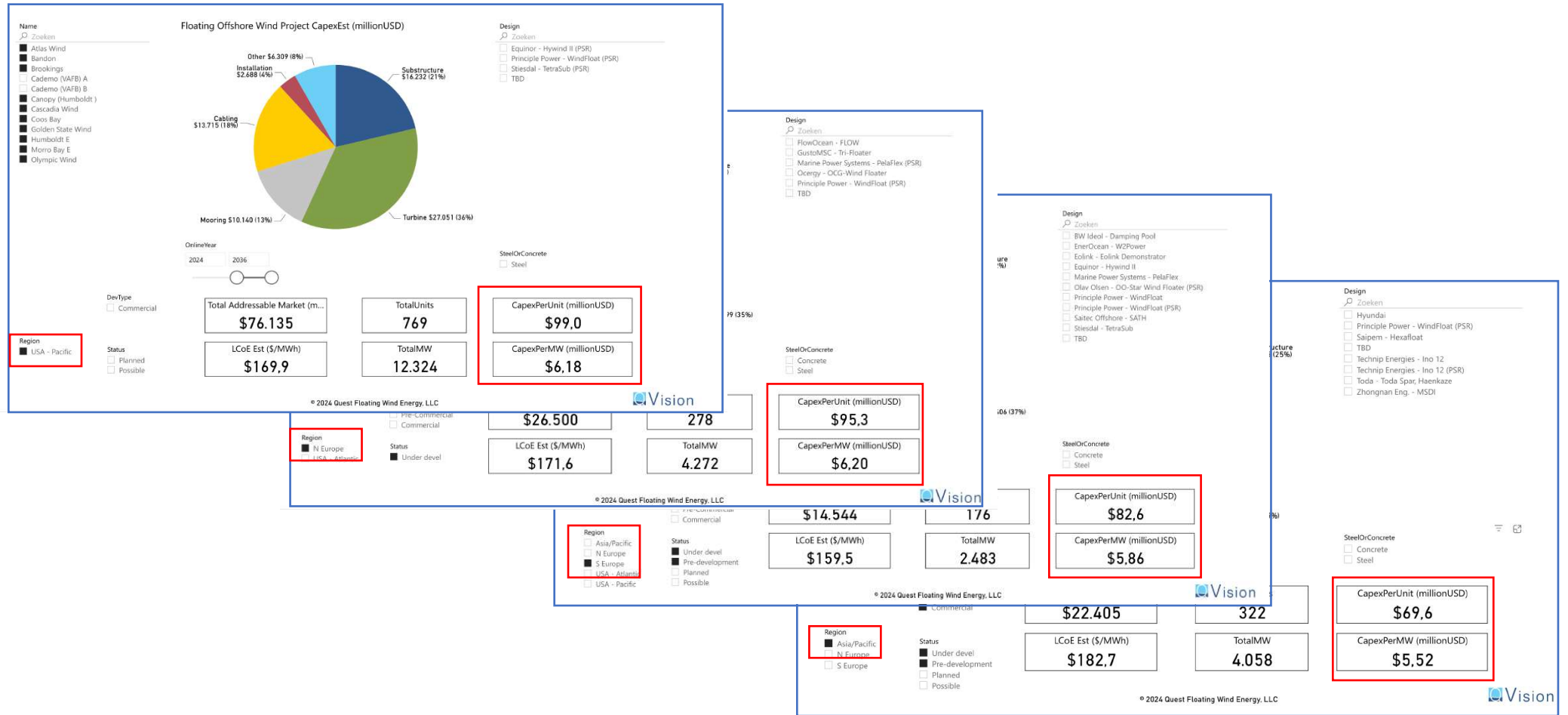
# Asia Under Development

Total #units forecasted for <2030

- 8 Projects including pre-dev. projects.
- Average LCoE \$182M



# CapEx/MW between various regions



Technology

# One Floater Design a Day ...

The Q FWE Database holds 145 'Concepts' of which 65 'mature' of which 15 are front runners, of which 4 are proven.

Concept ID	Company	Design	Capacity	Status	Location	Year	Notes	Website
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Floating Wind Designs of the World



Hilton Americas, Houston February 5-7, 2024

Floating Wind Solutions

# Floater Designs progress based on lessons learned



# Floater technology in the fast lane



## Technip Energies - Ino 15 - Steel 1

Designer	Technip Energies
DesignName	Ino 15
DesignerCountry	France
DesignGen	1
TRL	4
MaxMW	15
TurbinePreference	Vestas
SteelOrConcrete	Steel
HullShape	Semisub
ColumnQty	3
SteelWeight (t)	4300
ConcreteWeight (t)	
BallastWeight (t)	
TotalWtInclBallast (t)	4300
FloaterLng (m)	73
FloaterWidth (m)	73
FloaterHeight (m)	29
Draft (m)	14
MinOperWD (m)	50
Typical MoorSystem	Catenary
Typical MoorLinesPerUnit	3
BallastSystem	None
Assembly	Quayside
Tow	Entire Floater

PrincipalCertification	DNV
Certified	AiP DNV-RU-OU-0512, "Floating offshore wind power installations"



DesignNotes

DesignCt

DesignPr

Current F

Possible I

DesignUr



## Ocergy - OCG-Wind

Designer	Ocergy
DesignName	OCG-Wind Floater
DesignerCountry	USA
DesignGen	1
TRL	4
MaxMW	15
TurbinePreference	Vestas
SteelOrConcrete	Steel
HullShape	Semisub
ColumnQty	3
SteelWeight (t)	2800
ConcreteWeight (t)	
BallastWeight (t)	
TotalWtInclBallast (t)	2800
FloaterLng (m)	61
FloaterWidth (m)	61
FloaterHeight (m)	27
Draft (m)	14
MinOperWD (m)	30
Typical MoorSystem	Catenary
Typical MoorLinesPerUnit	3
BallastSystem	Passive
Assembly	Quayside
Tow	Entire Floater

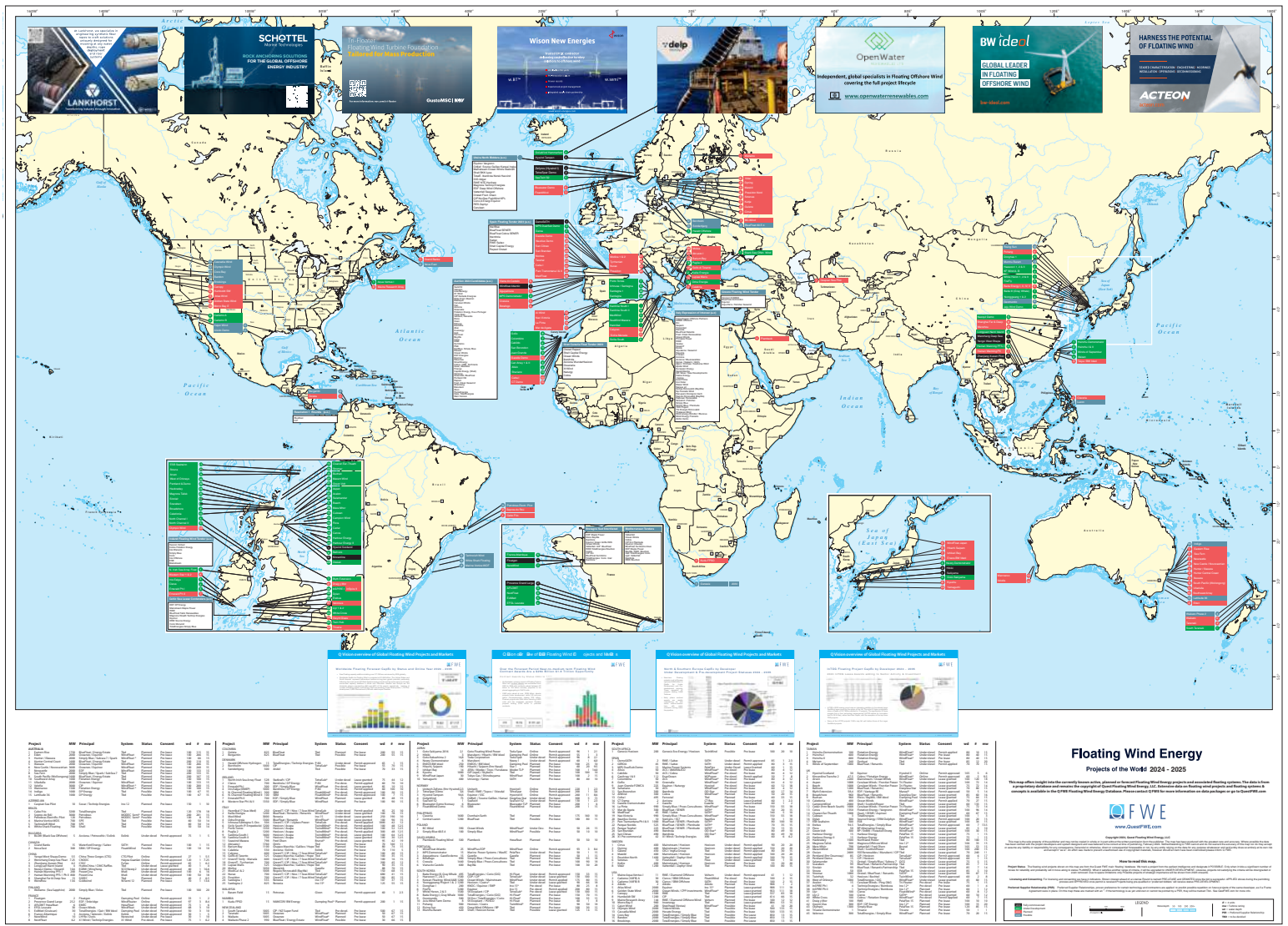
PrincipalCertification	
Certified	
DesignNotes	Concept design development by Windfloat designer Dominique Roddier, supported by Chevron and Moreld
DesignCharacteristics	Y-shape floater with central turbine.
DesignPros	Slim, light weight design. Claimed low cost design.
Current Projects	Atlantic OCS Floating Demo, Salamander, Hunter / Illawara
Possible Projects	
DesignUpdated	2023-06-12



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# Global Floating Projects 2024 World Map



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