

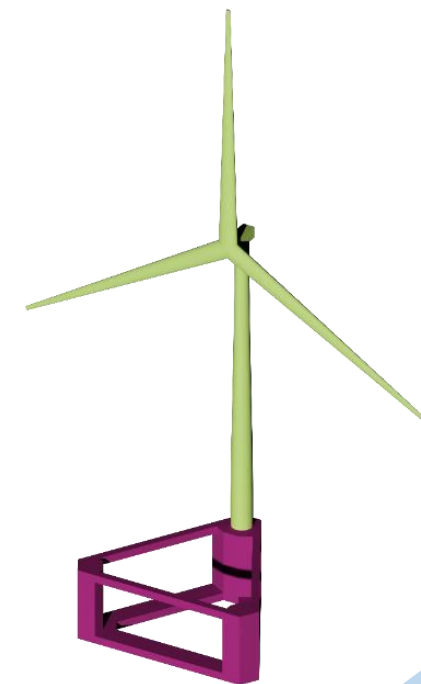


# Floating Wind Development in Taiwan

## -- Overview, Floater Design, & Anchor Mooring

**Kai-Tung Ma**, Professor  
National Taiwan University (NTU)

Mooring Integrity Users Group,  
FPSO Forum Week, Rotterdam  
June 16, 2022





# Offshore Wind in Taiwan

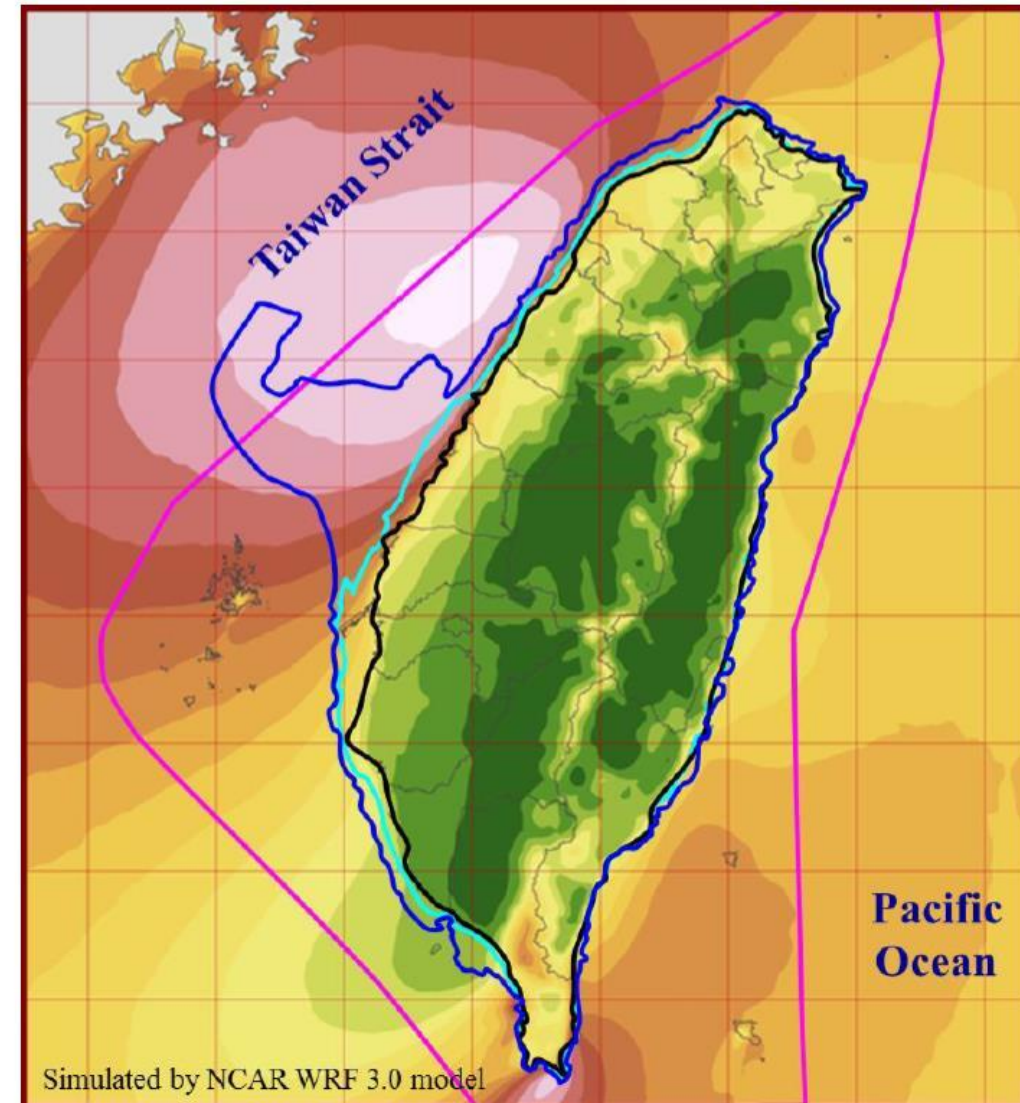
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It is hot, and floating is coming hot.

# Offshore Wind in Taiwan



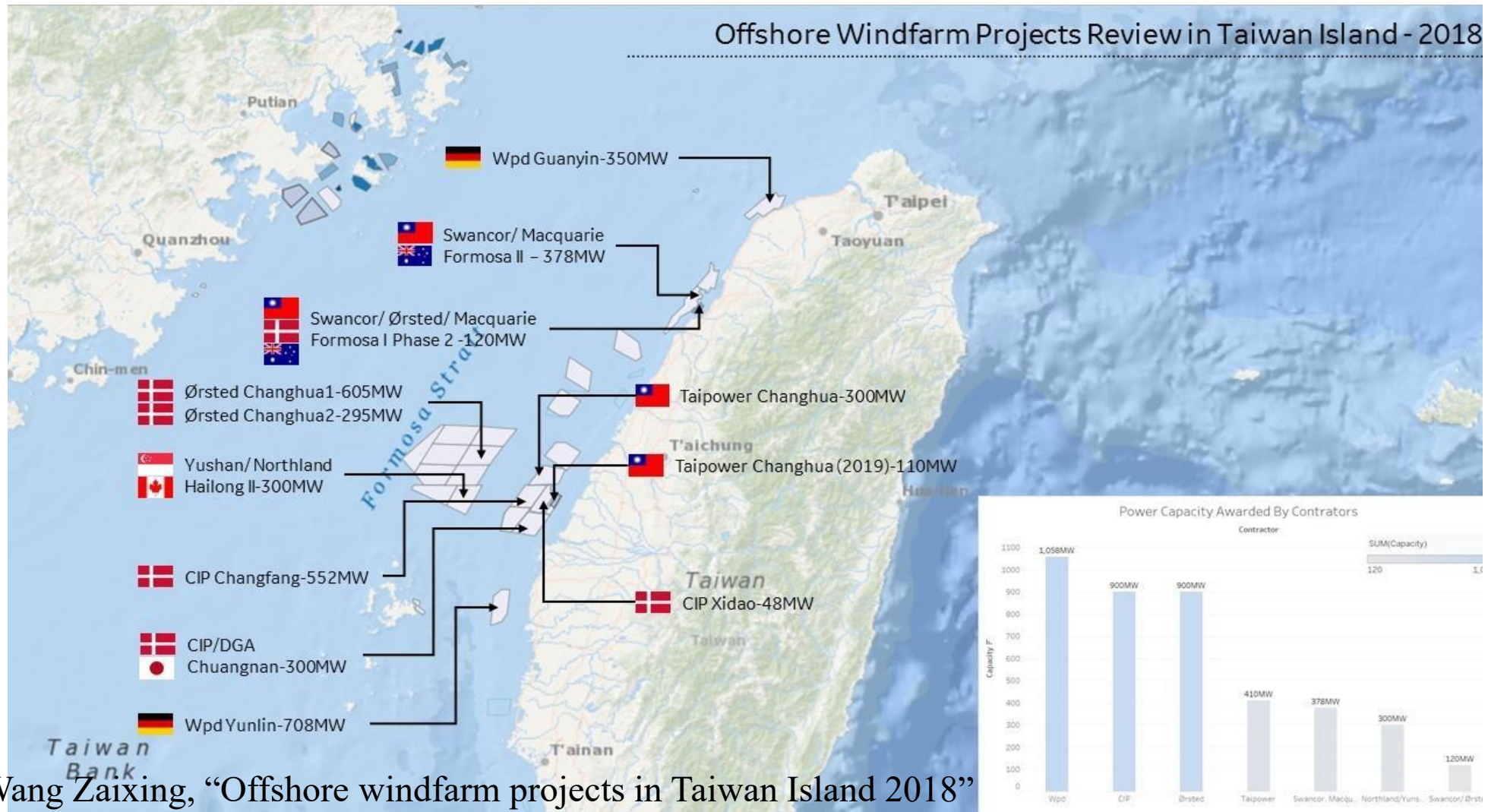
- Phase I, 2013 - 2021
  - 230 MW completed
  - Piles or jackets
- Phase II, 2021 - 2025
  - ~5 GW
  - Piles or jackets
- Phase III, 2026 - 2035
  - ~15 GW
  - **Deeper water, 50+ meters**



# Phase I & II Developments



- Phase I: 2 farms completed with fixed-bottom turbines.

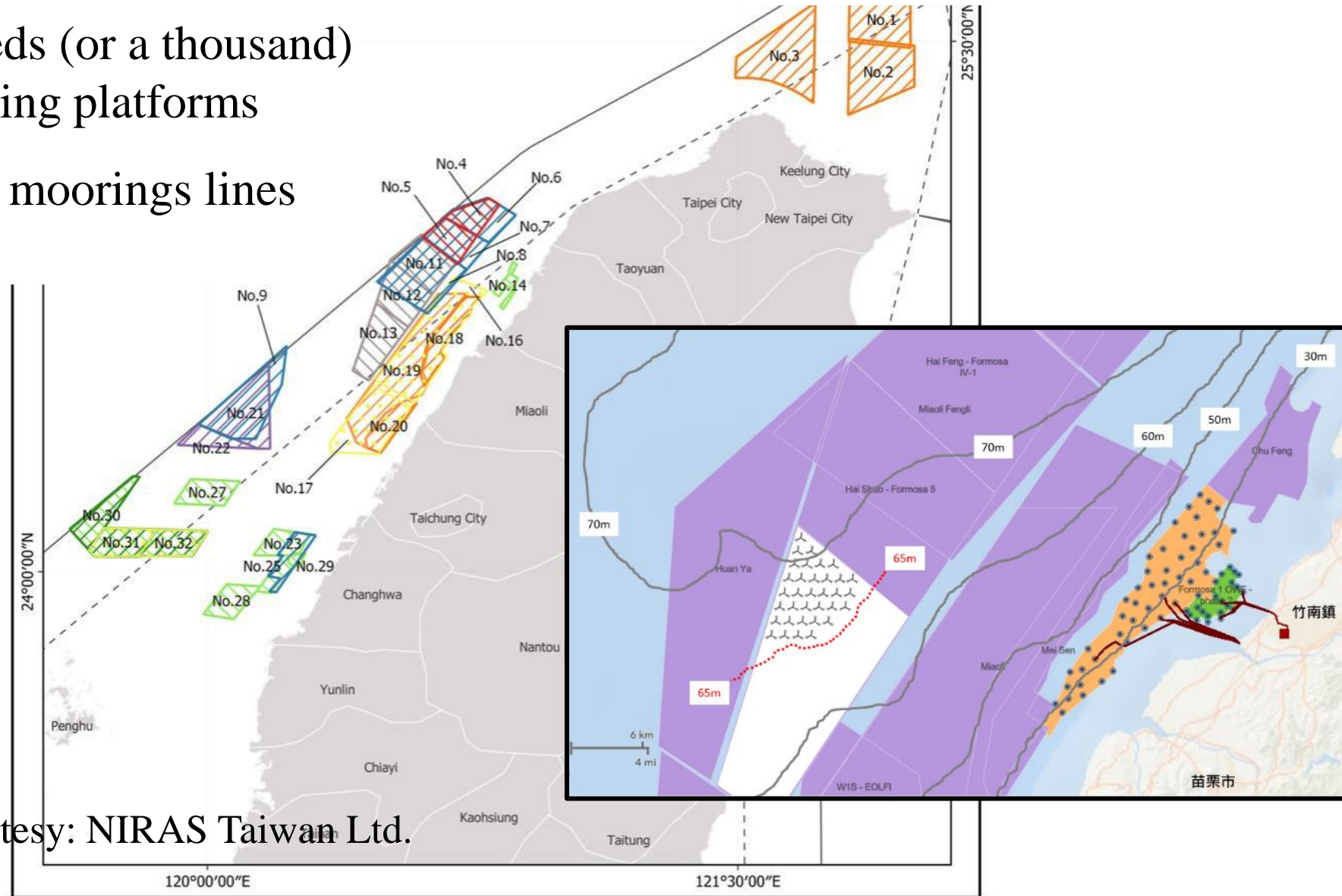




# Phase III, Floating will be the majority



- Hundreds (or a thousand) of floating platforms
- Lots of moorings lines



Picture Courtesy: NIRAS Taiwan Ltd.



# Floater Design

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Introducing a semi-sub designed by NTU, CSBC, & SOIC.

# Video play – TaidaFloat (1min 45sec)



國立臺灣大學  
National Taiwan University



# Designing TaidaFloat (for 15MW Turbine)



- Length: 82m
- Width: 91m
- Height: 35m
- Light Draft: 8m
- Loaded Draft: 20m
- Steel Weight: 3,900 tons
- Displacement: 20,000 tons





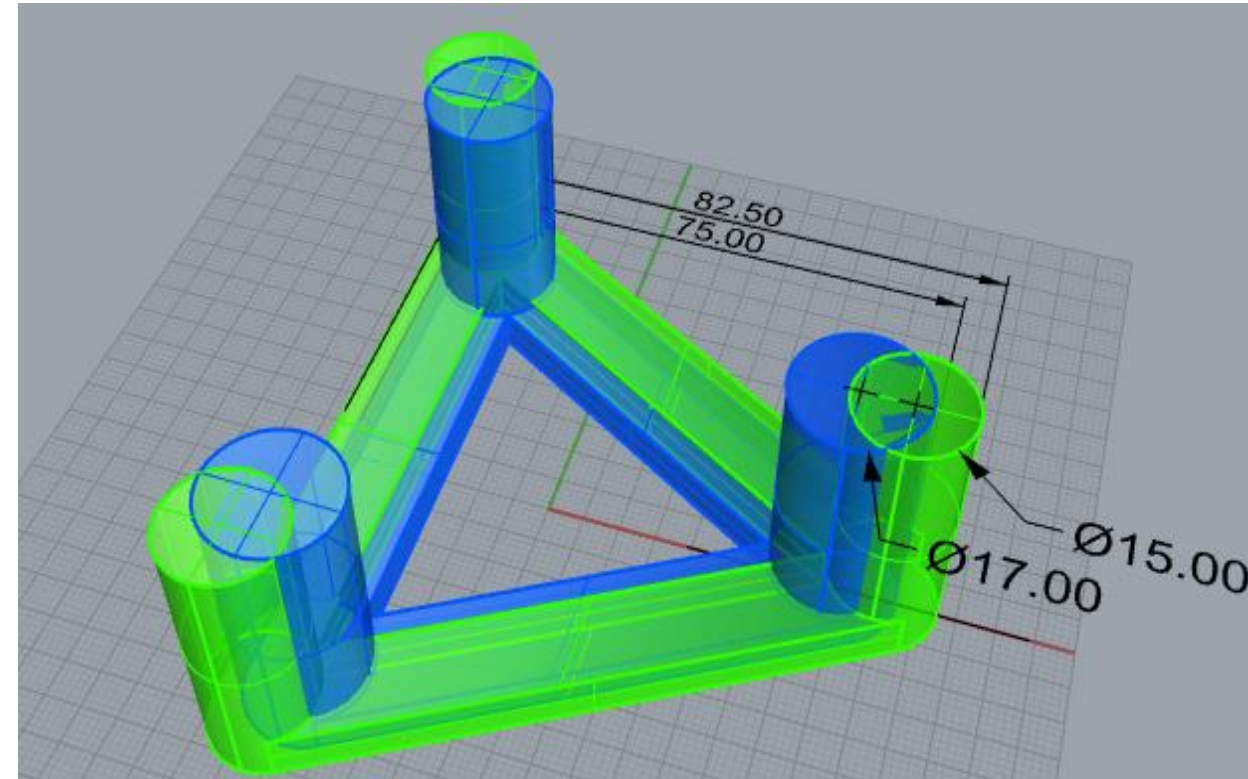
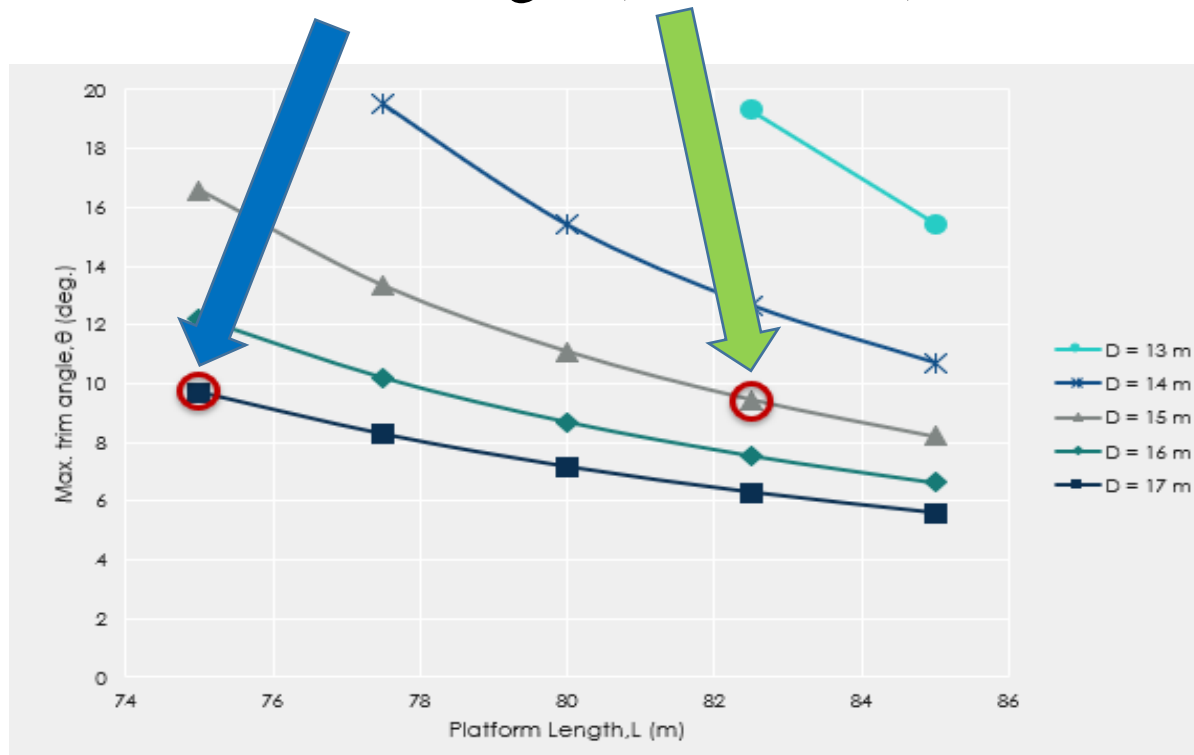
# Optimizing for Best Dimension



■ For carrying a 15MW turbine, balance between:

■ Stability (Trim angle  $< 10^\circ$  in operating condition), and

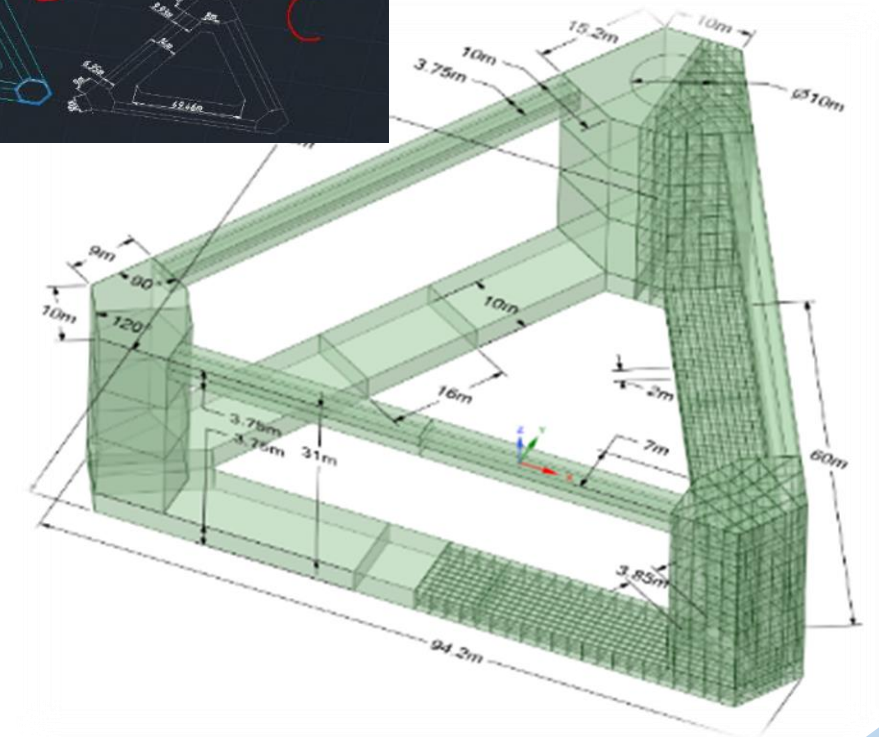
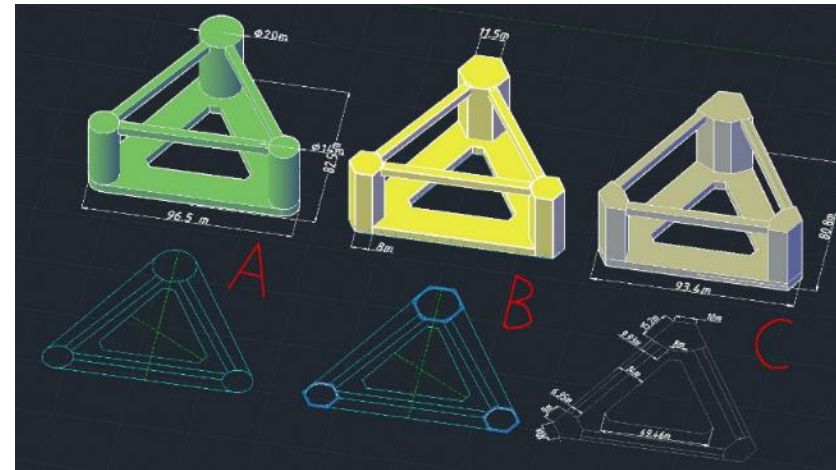
■ Steel weight ( $< 5000$  ton)



# Finalizing TaidaFloat's Design



- Flat panels for fast mass production.
- Next steps:
  - Model test
  - Class approval (AIP)





# Anchor Mooring

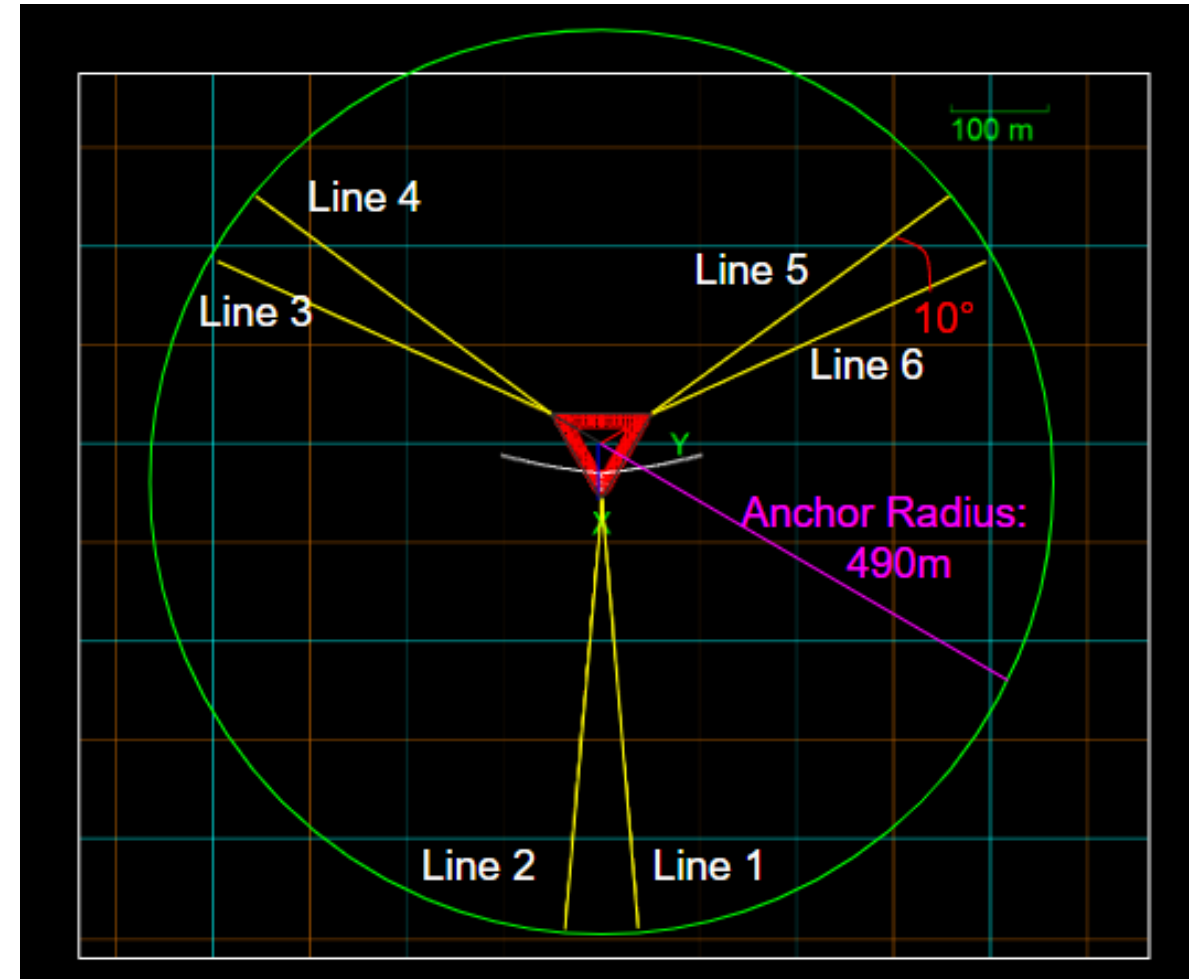
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Let's reduce costs by doing research.

# Mooring Design?



- 3x1 or 3x2 pattern?
- All chain?
- Pretension: 10% MBL?
- Grade: R3? R4? R5?





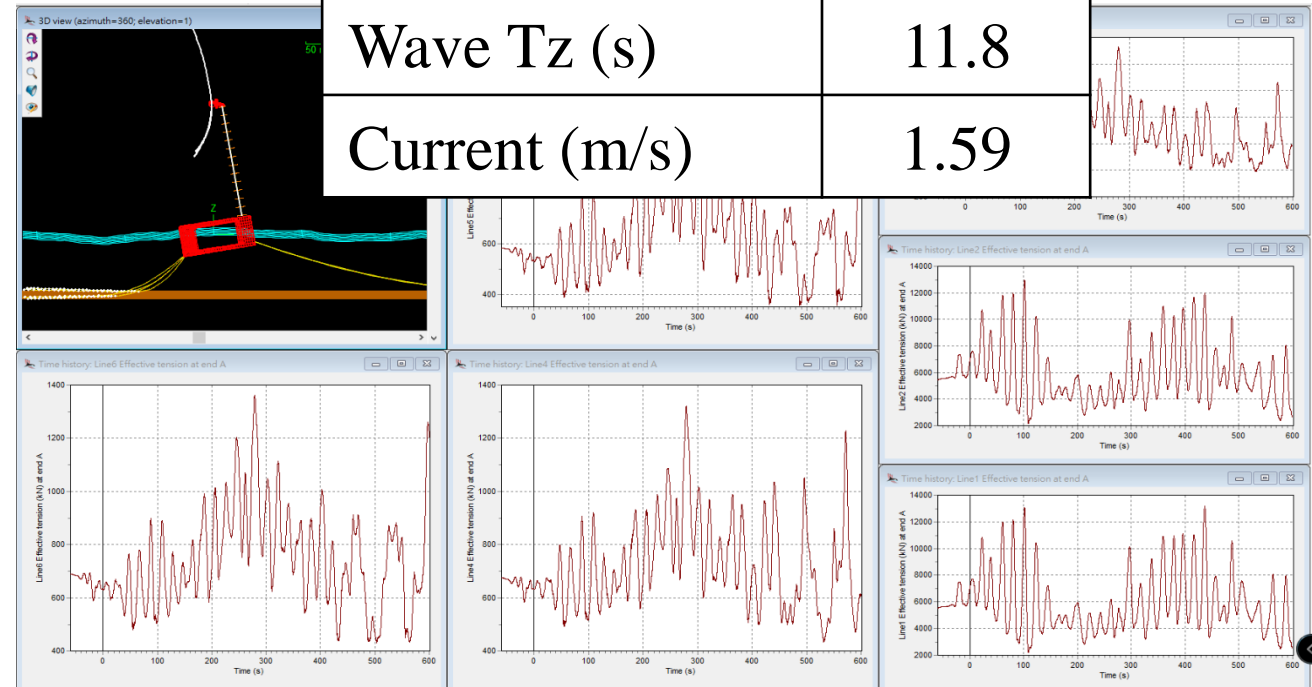
# Ideas for Reducing Cost?



- Reduce mooring radius?
- Install with in-line tensioners?
- Share anchors?
- Other ideas?

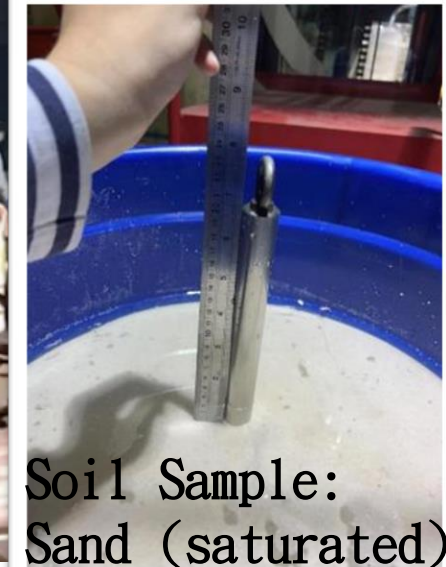
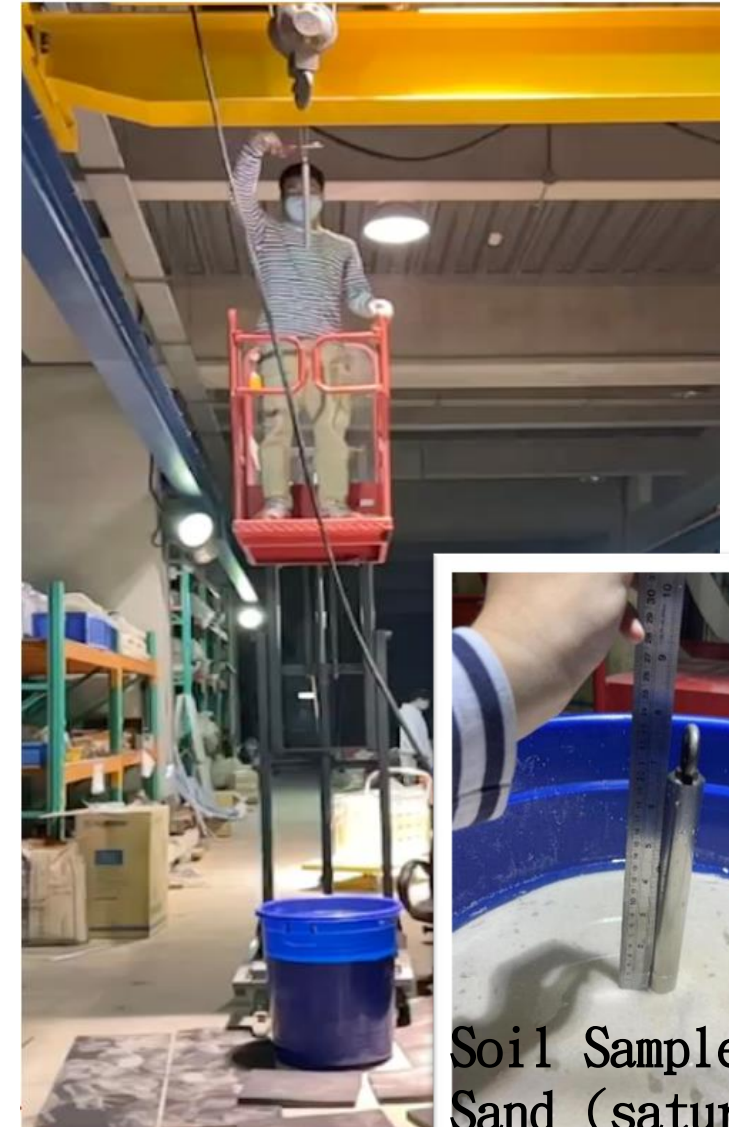
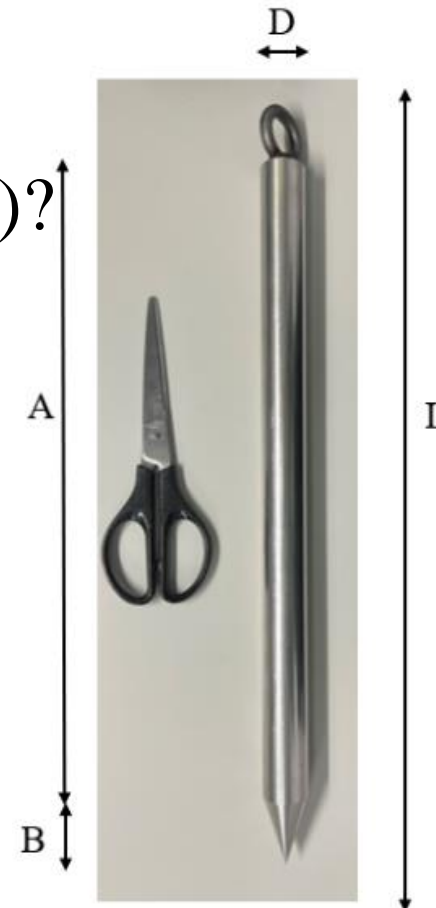
## 50-year, Taiwan Strait

Wind Speed (m/s)	57.0
Wave Hs (m)	12.72
Wave Tz (s)	11.8
Current (m/s)	1.59



# What Anchor Type?

- Drag anchor?
- Piles?
- Gravity installed anchor (torpedo)?
- Others?



# Conclusions



- Floating wind will be hot (in Taiwan & many areas).
- Semi should be the floater choice (for 50–100m depth).
- Anchor mooring needs more research.
  - To reduce cost.
  - To increase mooring integrity.





Thank you

“Let’s do research together.” -- KT