Wave Energy and Environmental Studies – Insights from the Lysekil Research Site, Sweden

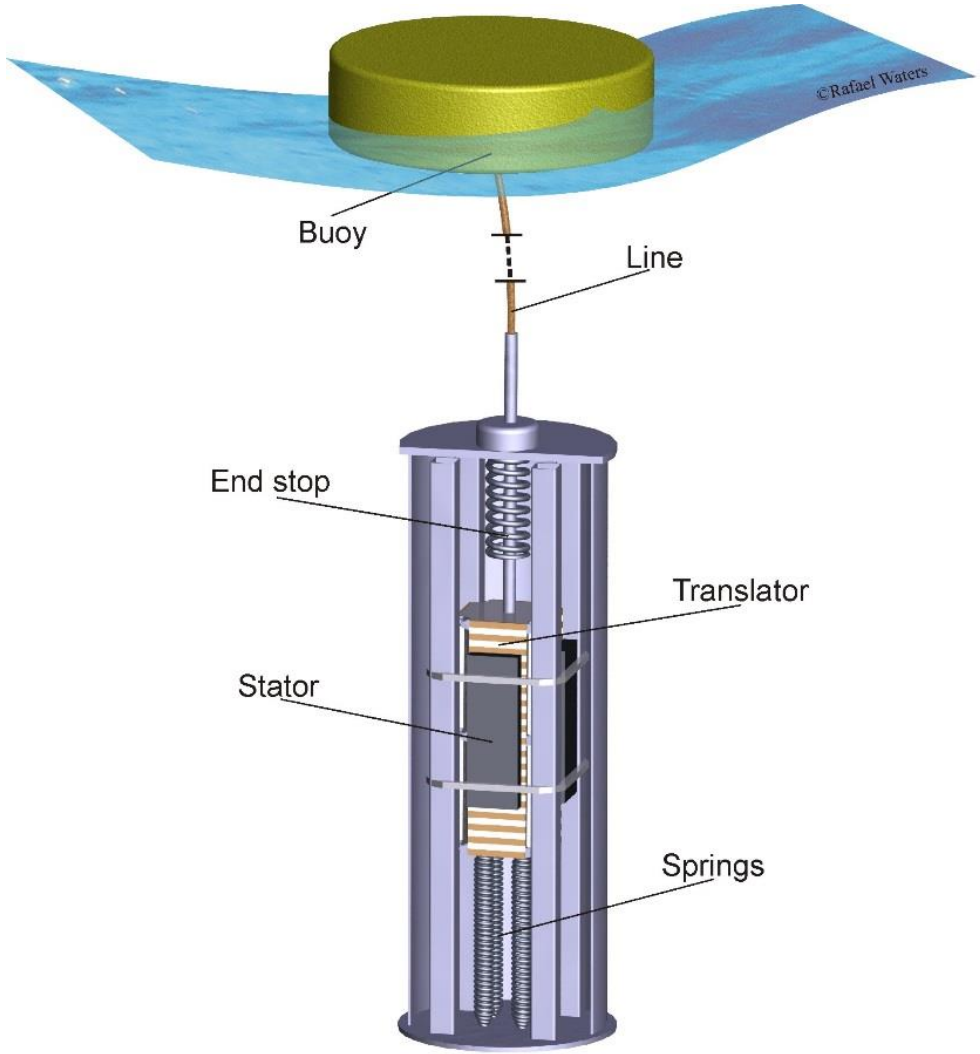
Uppsala University
Division of Electricity

Jan Sundberg, Olivia Langhamer,
Kalle Haikonen, Francisco Francisco,
Anke Bender

23. April 2020

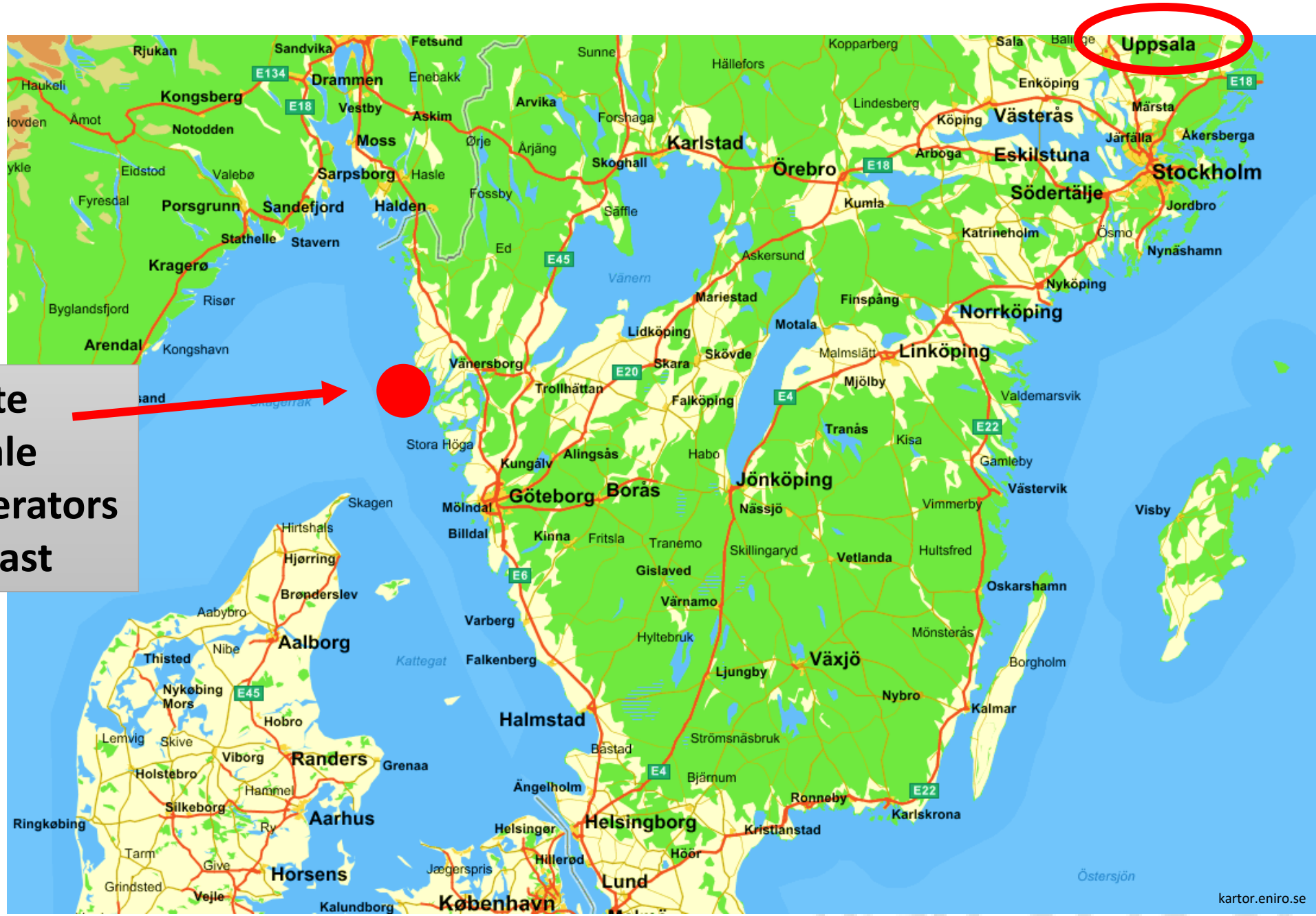
Environmental studies of wave power

- Development and research of a linear wave power generator since early 2000
- Practical and theoretical research in Uppsala and at Sweden´s west coast
- Environmental studies on full scale devices since beginning of the project
- EIA conducted in-house



UPPSALA UNIVERSITET

Lysekil Research Site with several full scale linear wave power generators at Swedens west coast



kartor.eniro.se

Environmental studies in Lysekil

- Studys of benthic infauna, biofouling & artificial reef effects
- Acoustic studys during deployment and operation
- Developing of monitoring tripod and use of sonars
- Follow-up long term investigation on artificial reef effects & no take zone

Benthic infauna, biofouling and artificial reef

- Sampling of benthic infauna around wave energy foundations and controls using core samples

-> higher biomass, diveristy and abundance in the park

- Biofouling estimatimation on wave power buoys

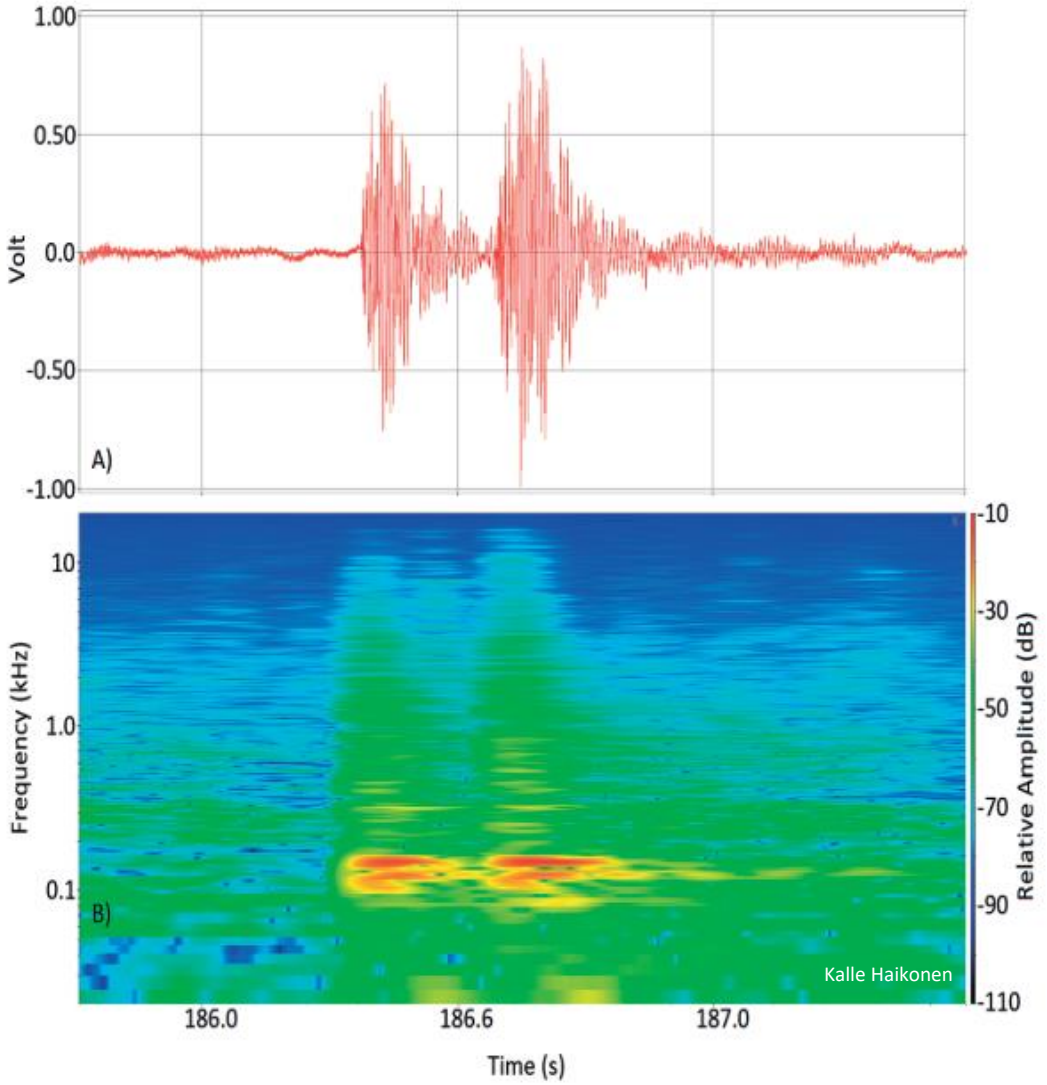
-> blue mussles main biofouling

- Visual surveys to assess artificial reef effects

->local incease of biodiveristy

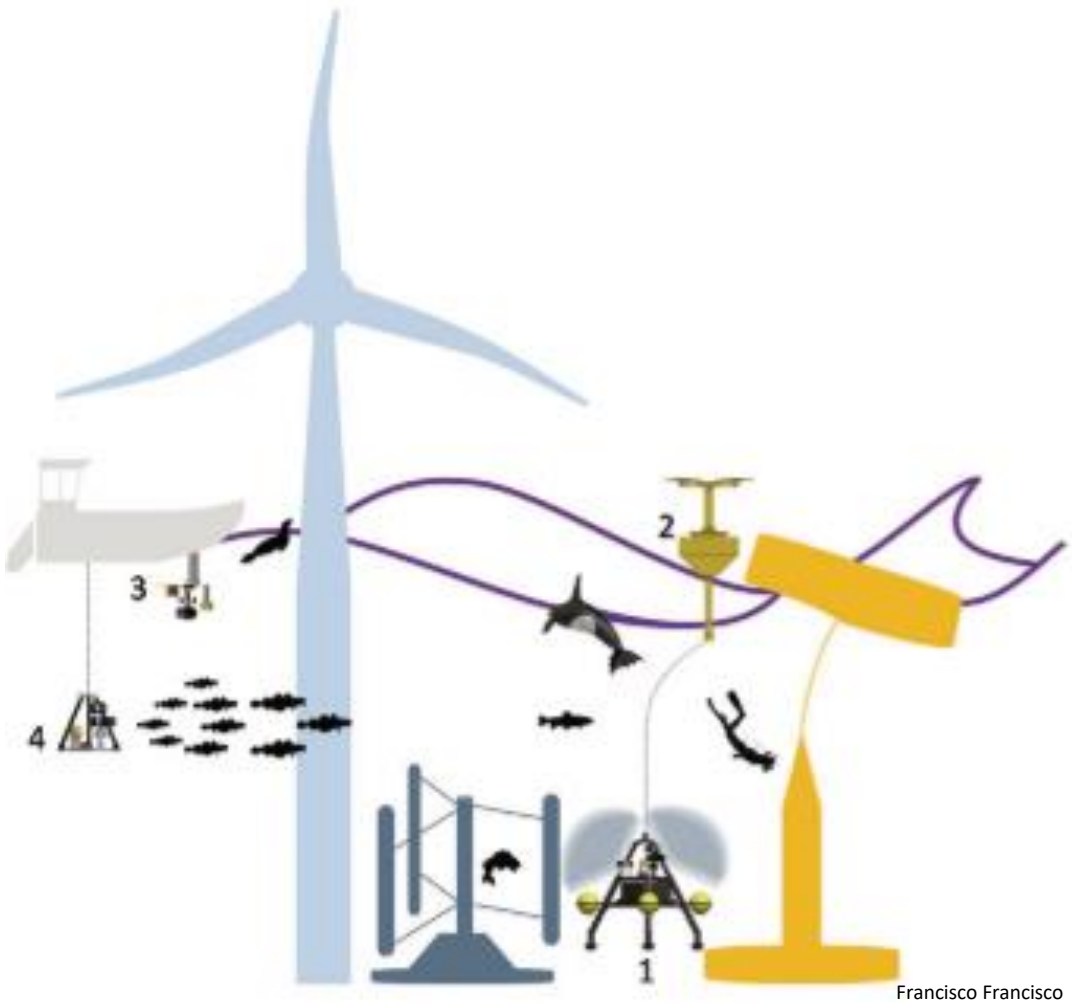
Acoustic studies

- Hydrophone recording at site during deployment and operation
- The noise is not expected to have any negative impacts on behaviour or mask any signals, unless in the vicinity (<150m) of the WECs in significant wave heights



Sonars for monitoring purposes

- Development of a monitoring tripod
- Sonars to monitor wave power devices and the environment
- Comparably cheap, safer than e.g. divers
- Once deployed it can give information during harsh weather conditions
- Multifunctional application



Francisco Francisco

Long term studies on artificial reef effects & no take zone

- Long term artificial reef studies
  - local effects
  - Community differences through complexity of foundations
- Cage fishing with two cage models
  - Influences on crustaceans on a broader scale in Lysekil – no effects
  - Effects on a broader scale in Sotenäs (wave power site)
  - No take zone

Conclusions

- Infauna biomass is higher around foundations than in control sites
- Blue mussels are main biofouling species on wave power buoys
- Noise is not expected to have negative impacts on behaviour or mask signals, unless in the vicinity (<150m) of the WECs in significant wave heights
- Successful use of sonar tripod for detection of fish and marine mammal occurences in the wave power site
- Local artificial reef effects locally, but no effects on crustacean community on a broader sacle and area


Thank you for listening!