CCELL

ADB – Blue Economy

Dr Will Bateman

6th May 2022

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CCELL TEAM

Dr Will Bateman

CEO

Howard Lewis

Chairman

Andrew Cant

CFO

IN THE PRESS

pwc

Net zero – top 50 to watch

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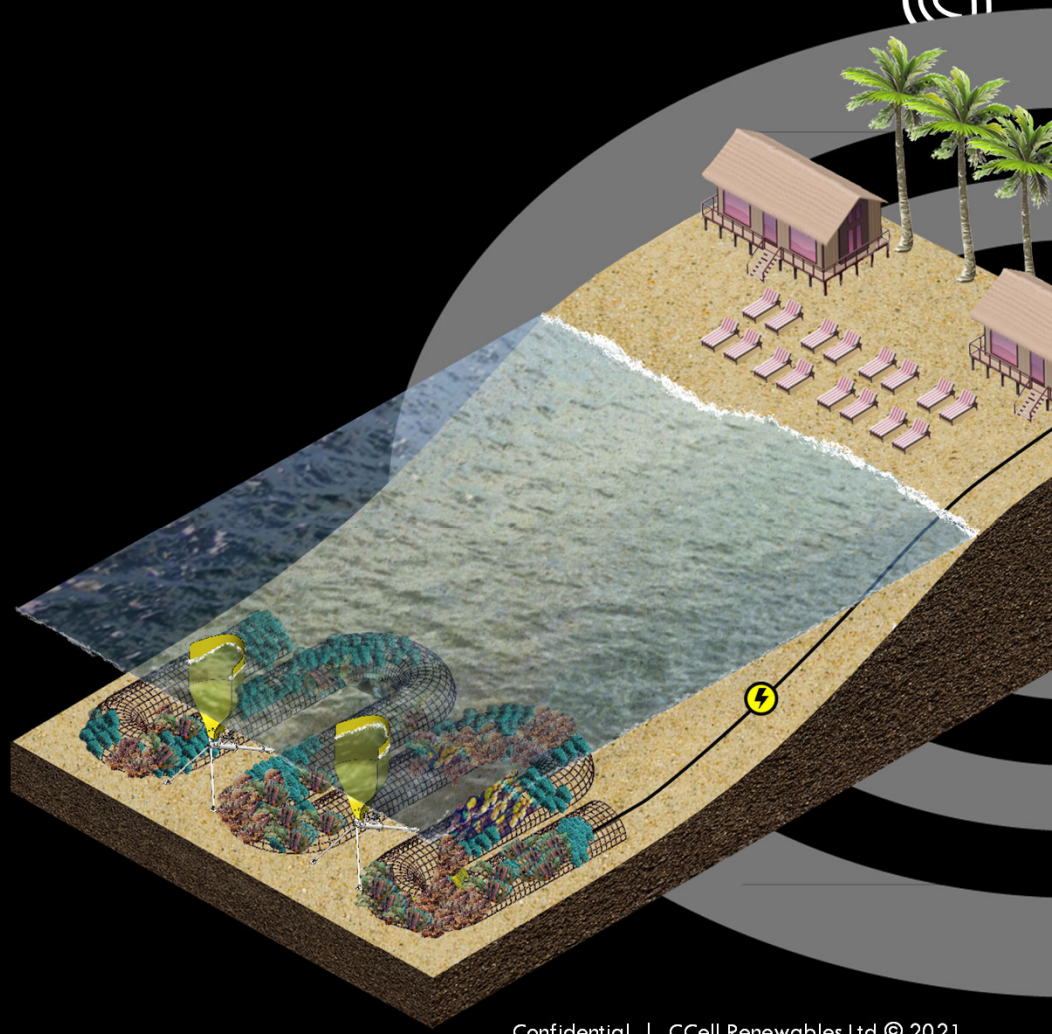
CCELL

Our Mission: is to combat coastal erosion by working with nature to restore a sustainable balance to coastal environments and bring lasting protection to communities around the world.



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SUPPORT CCELL – CROWD FUNDING

Please support us in raising Equity finance to implement our mission

Invest in CCell: Please share this link and invite investors to sign up here: https://www.ccell.co.uk/crowdfunding

Follow our LinkedIn account: https://www.linkedin.com/company/ccelluk where we will be posting our latest stories

Join our Whatsapp group: https://chat.whatsapp.com/D5c4I9exlvvGGrlLeWKR7C

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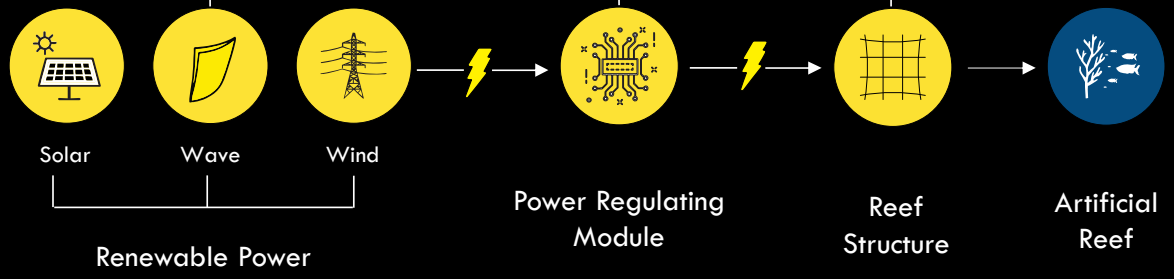
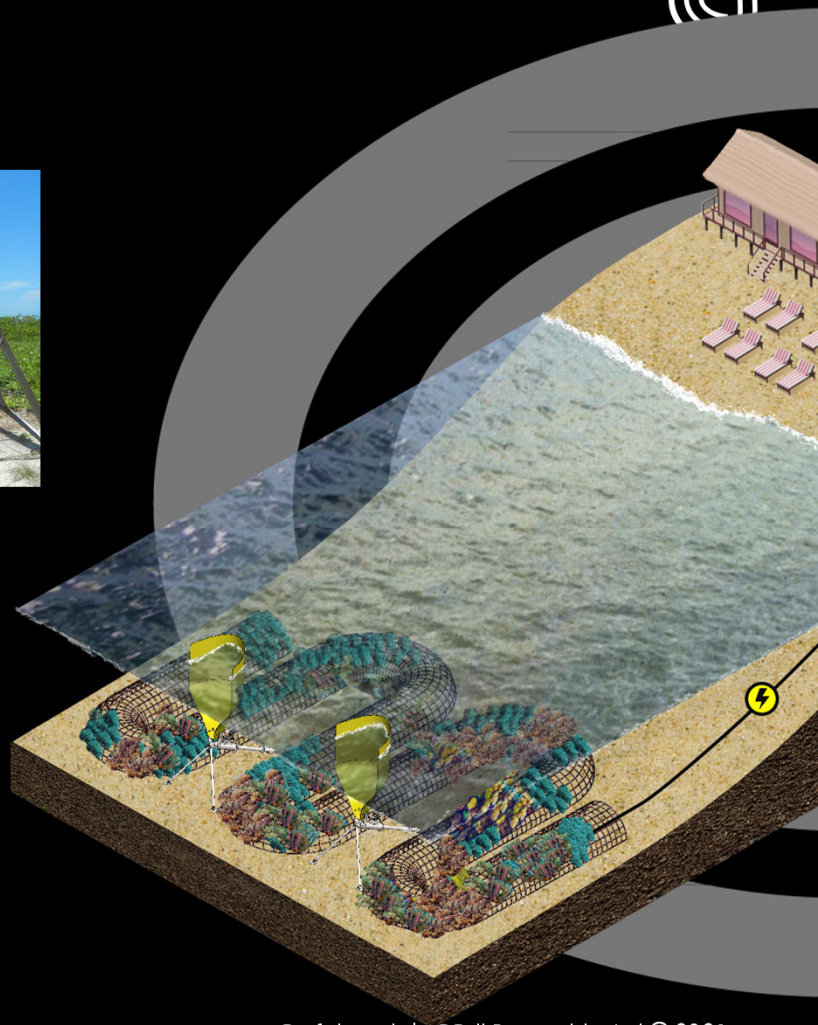
CCELL – THE DIGITAL REEF





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THE PROBLEM

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Google beach erosion

before and after | hurricane matthew | house | coastal | ocean | storm | jetty | groin | diagram | shoreline

Beach Erosion Lesson for Kids - Video ...
study.com

Coastal erosion – News, Research and ...
theconversation.com

crumbling coasts amid climate crisis ...
theguardian.com

climate crisis – study ...
theguardian.com

Effects of coastal erosion
thezebra.com

Precipitation to Coastal Erosion ...
eos.org

Beach Erosion - an overview ...
sciencedirect.com

18 East Riding homes at risk of falling ...
hulldailymail.co.uk

garden falls into the sea ...
itv.com

Beach erosion Images, Stock Photos ...
shutterstock.com

Coastal erosion at Skipsea - Internet ...
internetgeography.net

coastal erosion with sandscaping scheme ...
theguardian.com

Eighteen Yorkshire homes under threat ...
yorkshirepost.co.uk

Disappearing Beaches ...
seagoinggreen.org

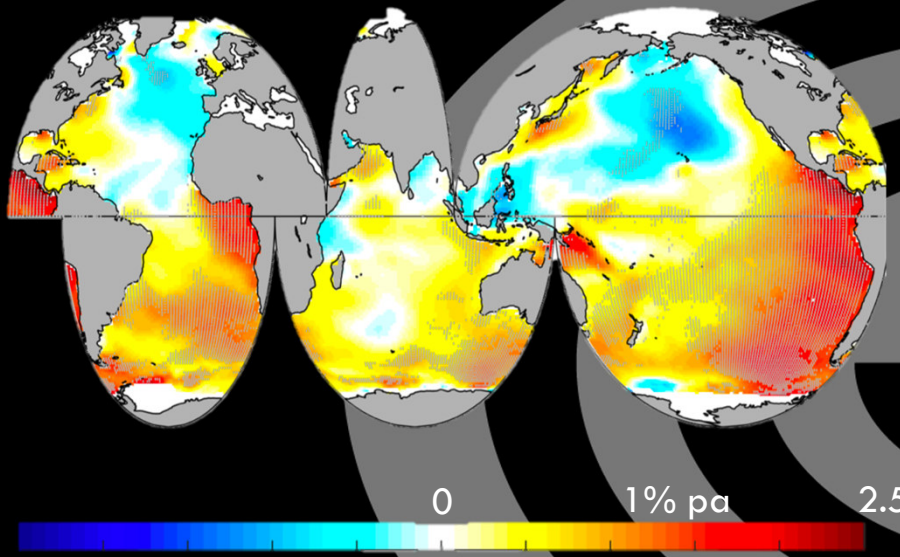
Great Yarmouth Mercury
greatyarmouthmercury.co.uk

THE PROBLEM

Playa del Carmen, Mexico

51%

shorelines eroding



Annual Increase in Wave Energy

£120 B pa

UN estimate

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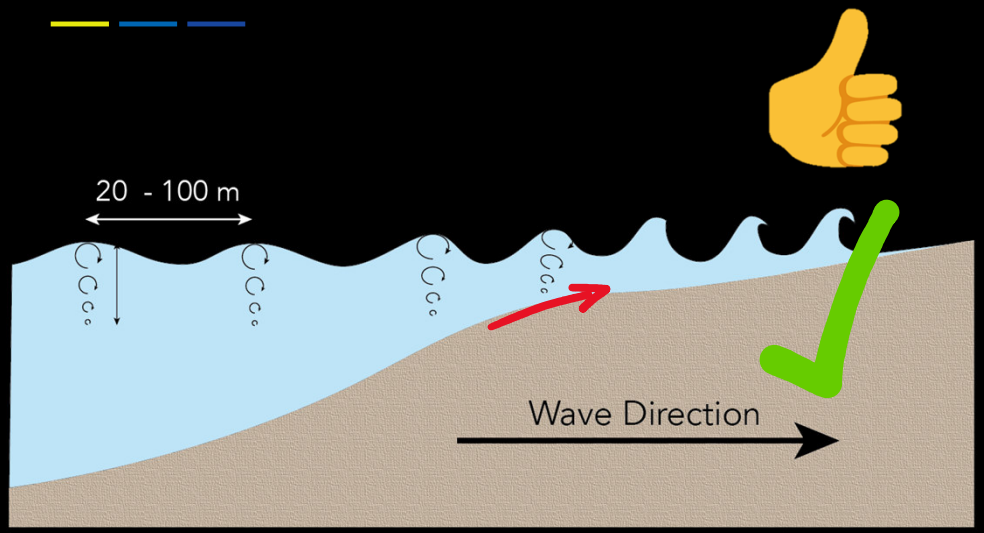
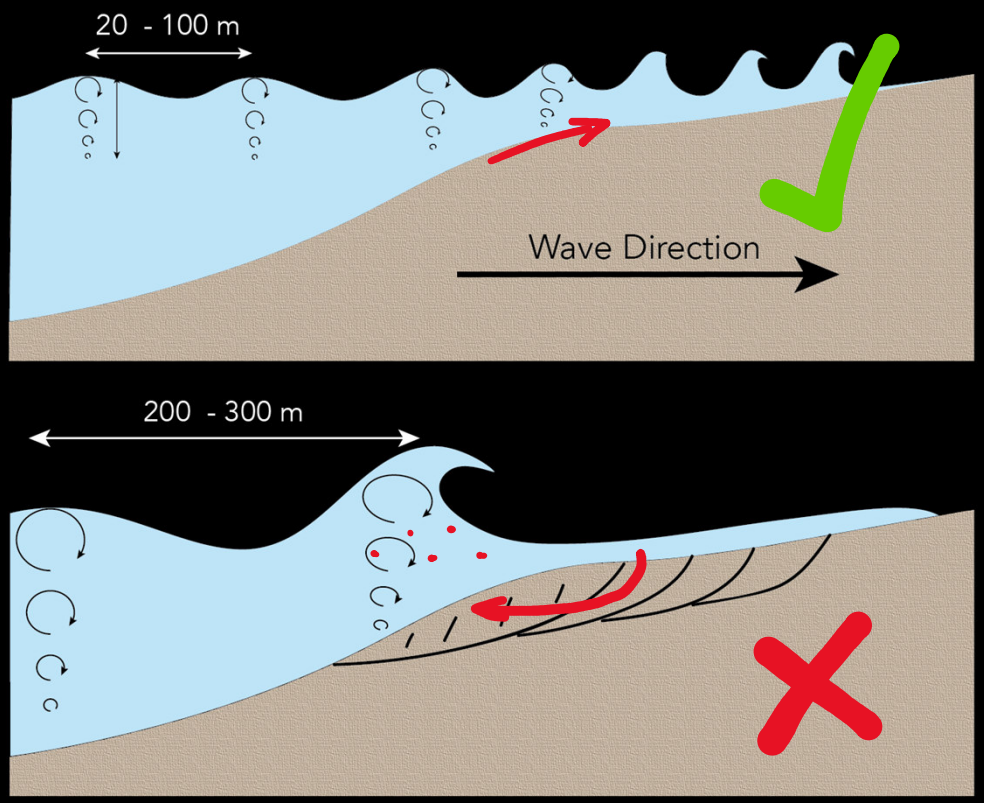
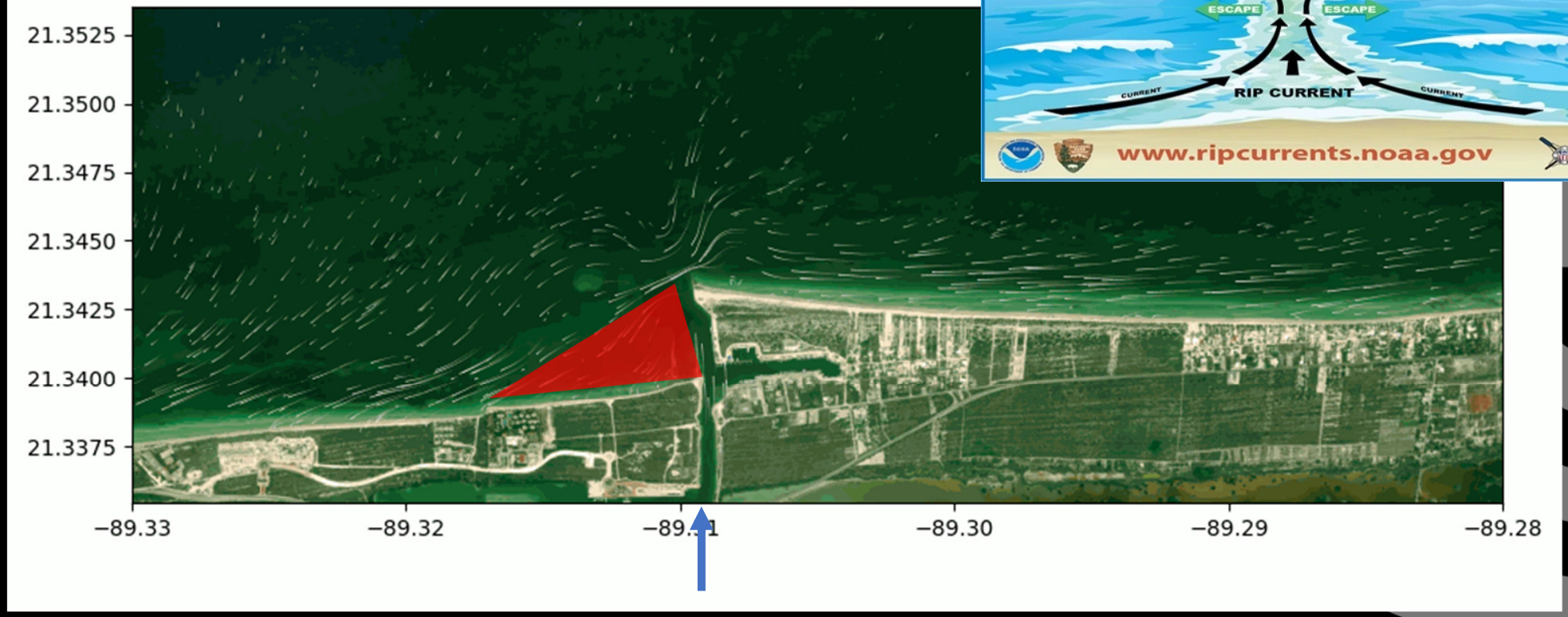
WHY - OCEAN WAVES

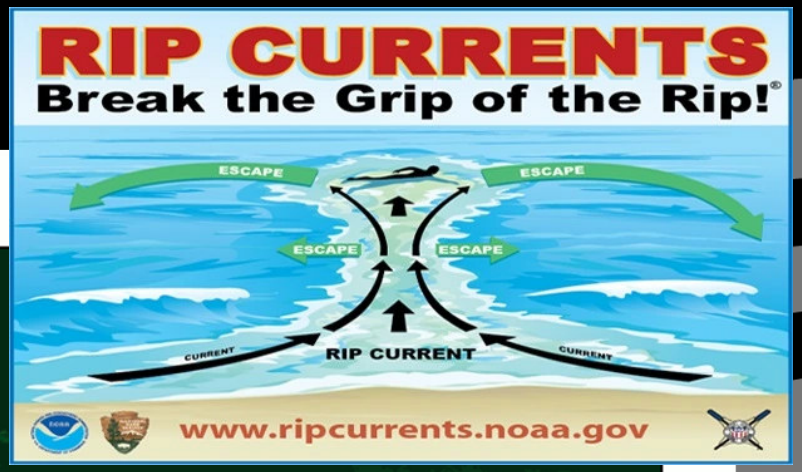


WHY - OCEAN WAVES



WAVE INDUCED - LONG SHORE CURRENTS





River

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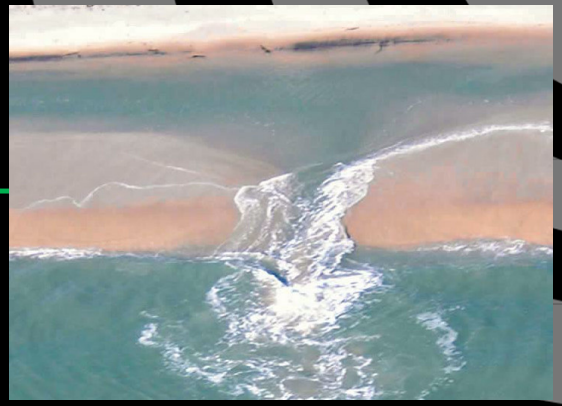
WHY – SUMMARY



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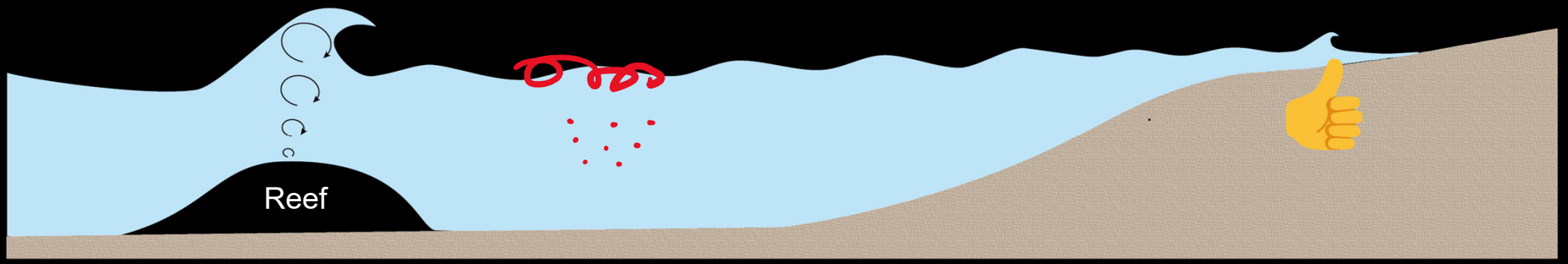
THE NATUREAL SOLUTION

200 M

PEOPLE PROTECTED BY
CORAL REEFS



50% LOST CORAL REEFS
WITH THE REMAINDER SEVERELY AT RISK

CCELL SOLUTION

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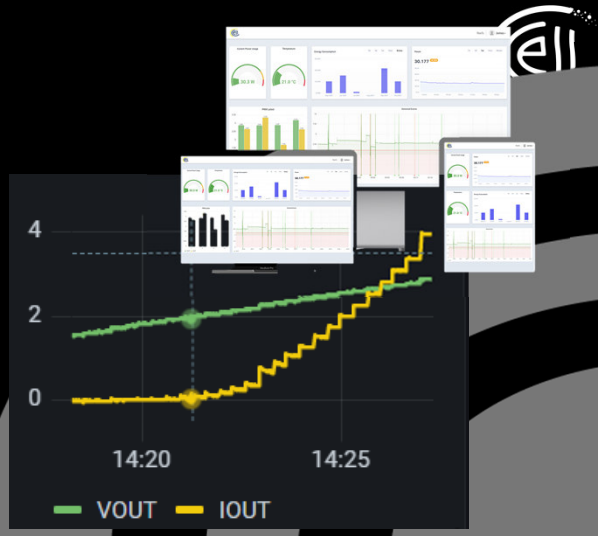
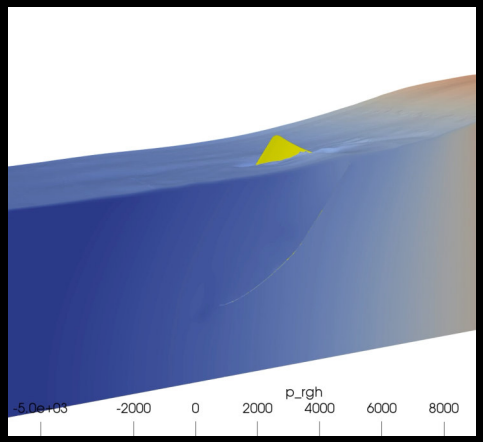
CCELL SOLUTION – THE DIGITAL REEF

MODELLING

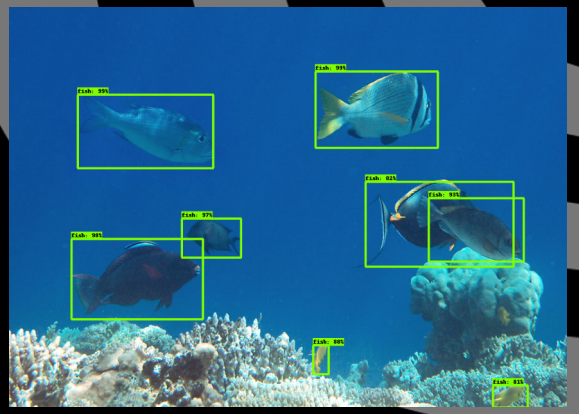
THE REEF



REMOTE MONITORING



WAVE PADDLE



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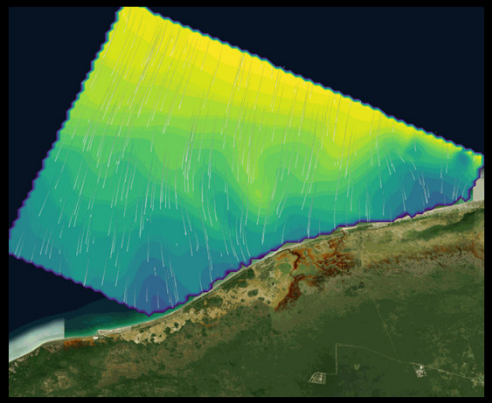
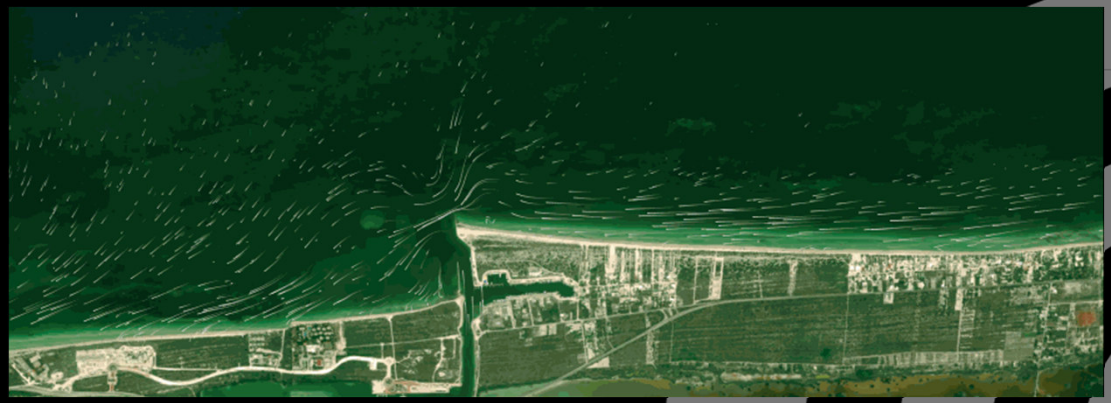
SITE MODELLING

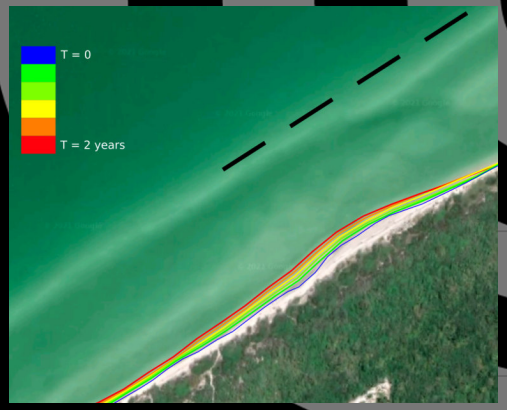


WAVE PROPAGATION



WAVE-INDUCED CURRENTS

WAVE STRUCTURE INTERACTION



COASTAL MORPHOLOGY

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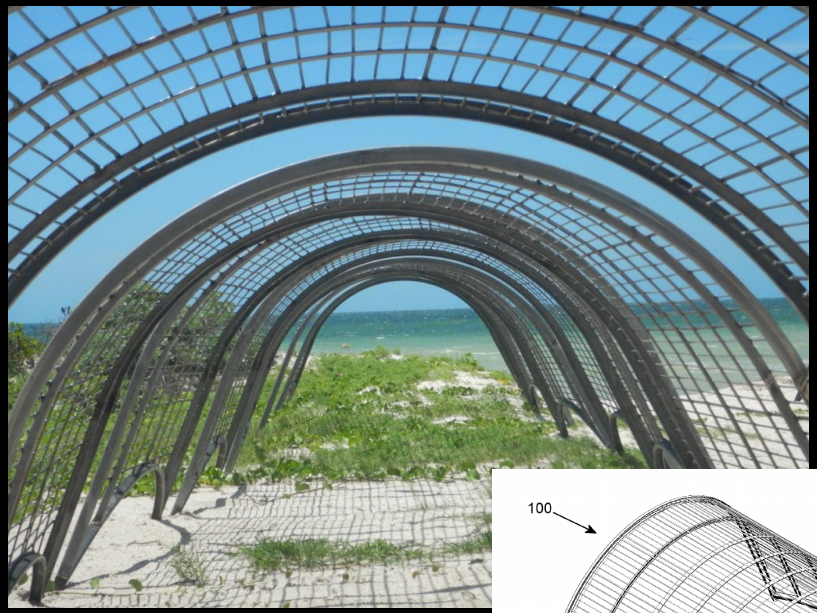
REEF - STRUCTURE



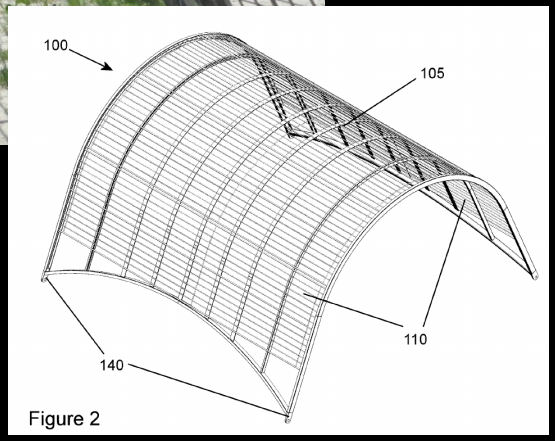


Figure 2

PATENT PENDING

MANUFACTURABLE

STACKABLE

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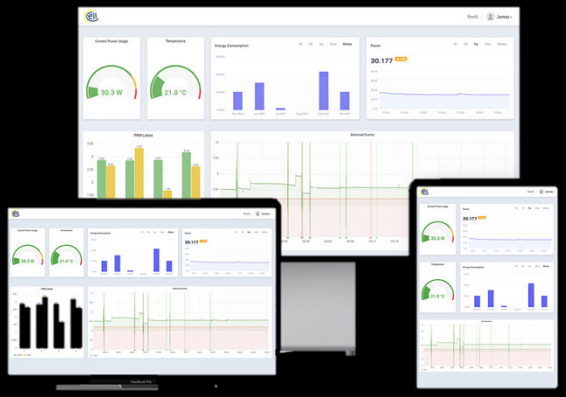
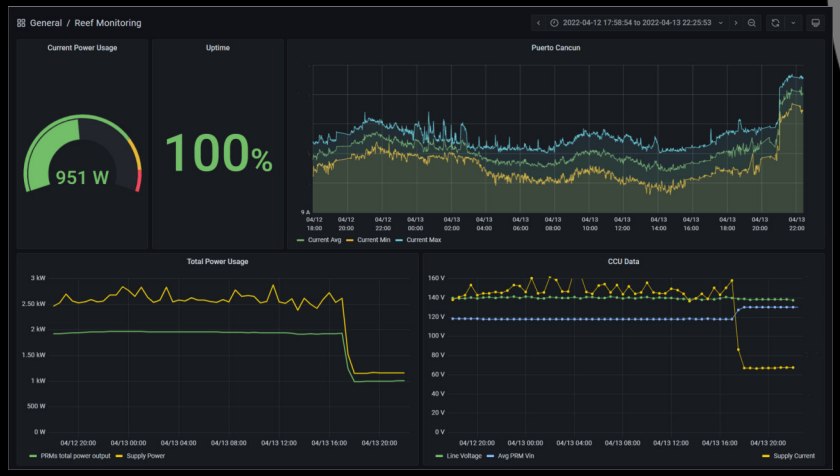
REEF - ELECTRONICS

POWER REGULATION



REAL TIME REMOTE MONITORING



POWER BALANCING

CENTRAL CONTROL UNIT

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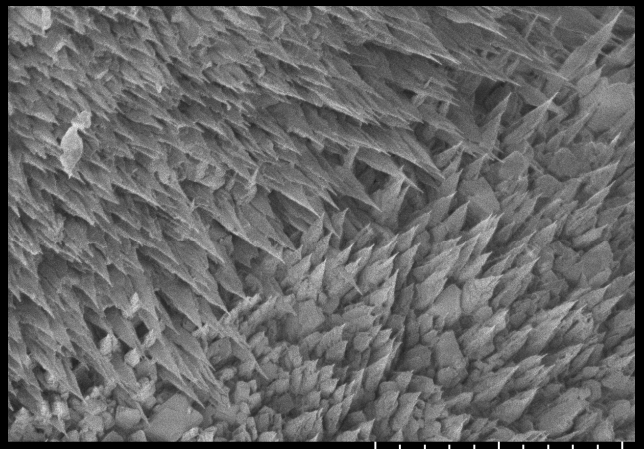
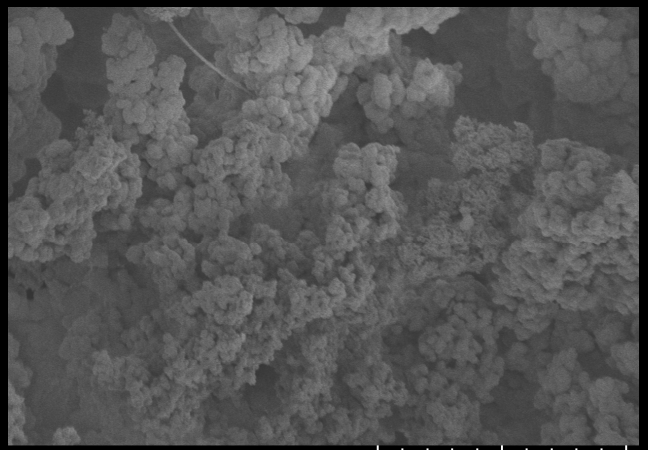
ELECTRONICS - ROCK GROWTH OPTIMISATION

Collaboration with CSIC in Madrid

CSIC
Spanish Council of Research





Brucite (magnesium)

- Occurs more when current density is too high.
- Soft to the touch
- Easily detaches
- Grows quickly

Aragonite (calcium)

- Occurs more at target current densities
- Hard and strong
- Grows more slowly

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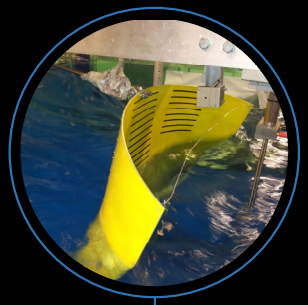
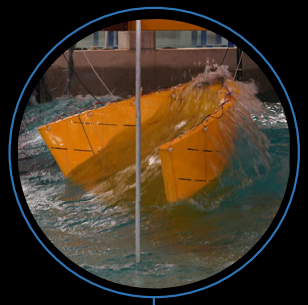
CCELL WAVE PADDLE - PROGRESS



2012 Concept Conceived

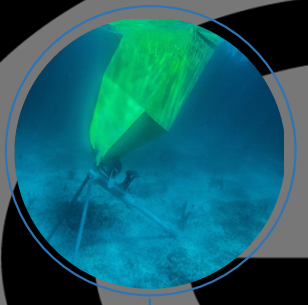
2013 Initial testing



2014 Proof of Concept

2015 Near Shore Testing (Steel Design)

Composite Lab Design



2018 Pilot - Cozumel

TECHNICAL COLLABORATORS

ATKINS

Lloyd's Register

UNIVERSITY OF BATH

UNIVERSITY OF EXETER

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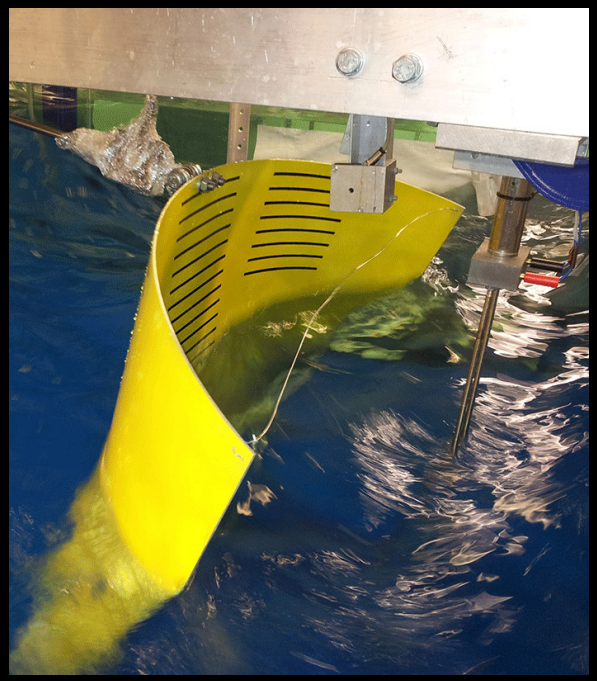
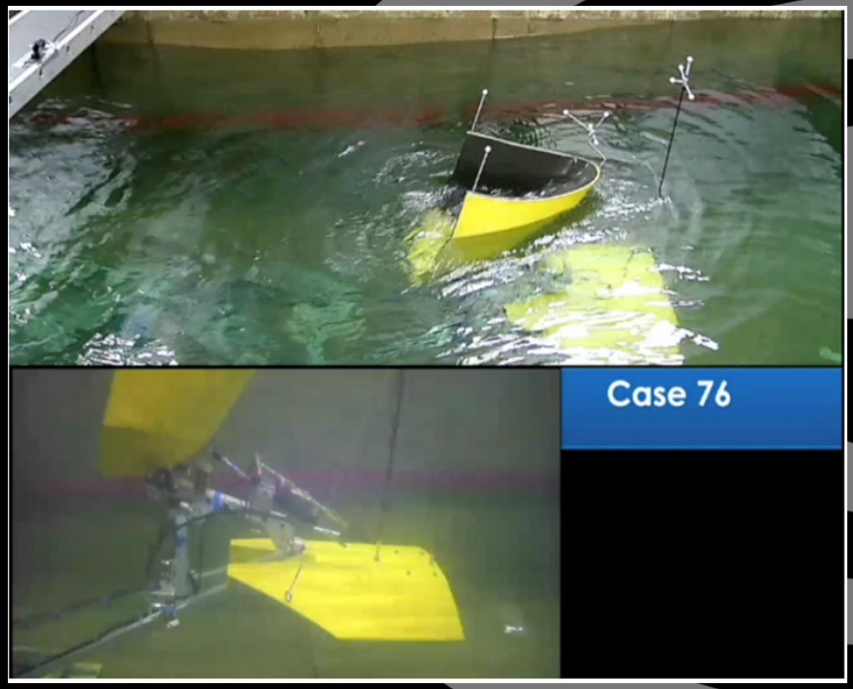
CCELL WAVE PADDLE – LABORATORY MODEL TESTING





2016

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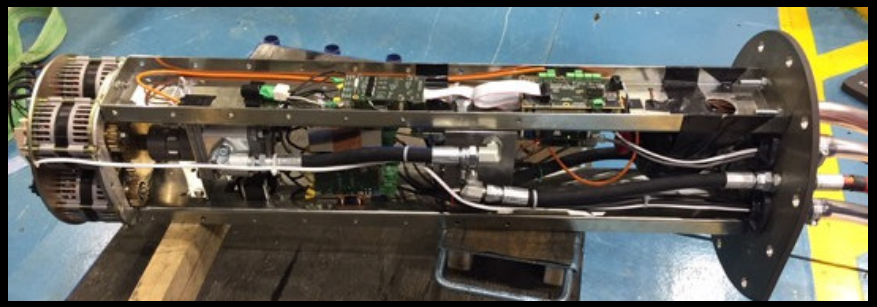
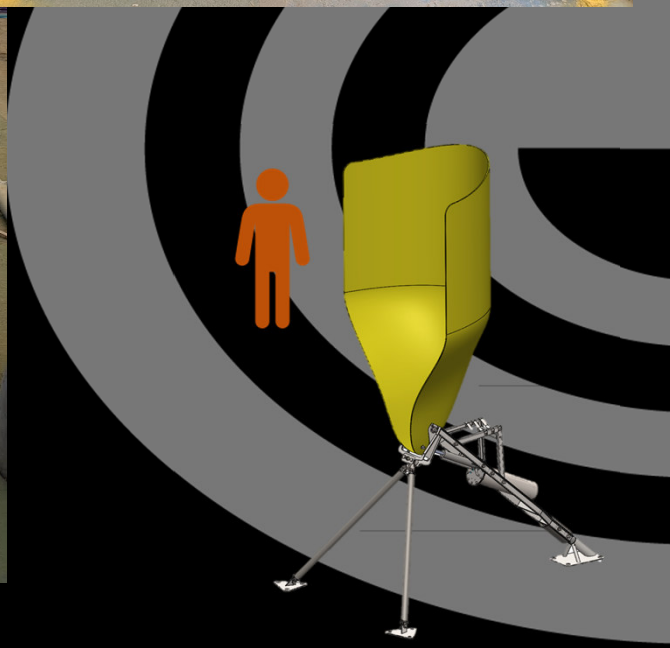
CCELL WAVE PADDLE - V3



POWER TAKE OFF

ASSEMBLY



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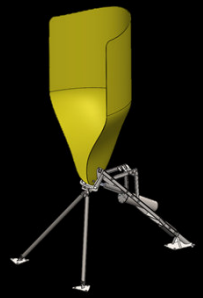
COMPETITOR ANALYSIS

CCell wave paddle represented a step change in performance to weight relative to the prior art.

AQUAMARINE



CCELL

POWER	WEIGHT	COST
800 kW	600,000 kg	£12,000,000
266 X	2000 X	1200 X
3 kW	310 kg	£10,000

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EXAMPLE INSTALLATIONS

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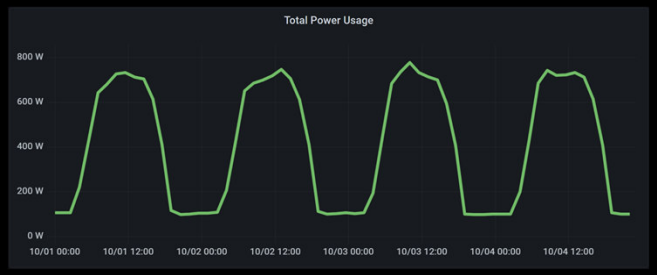
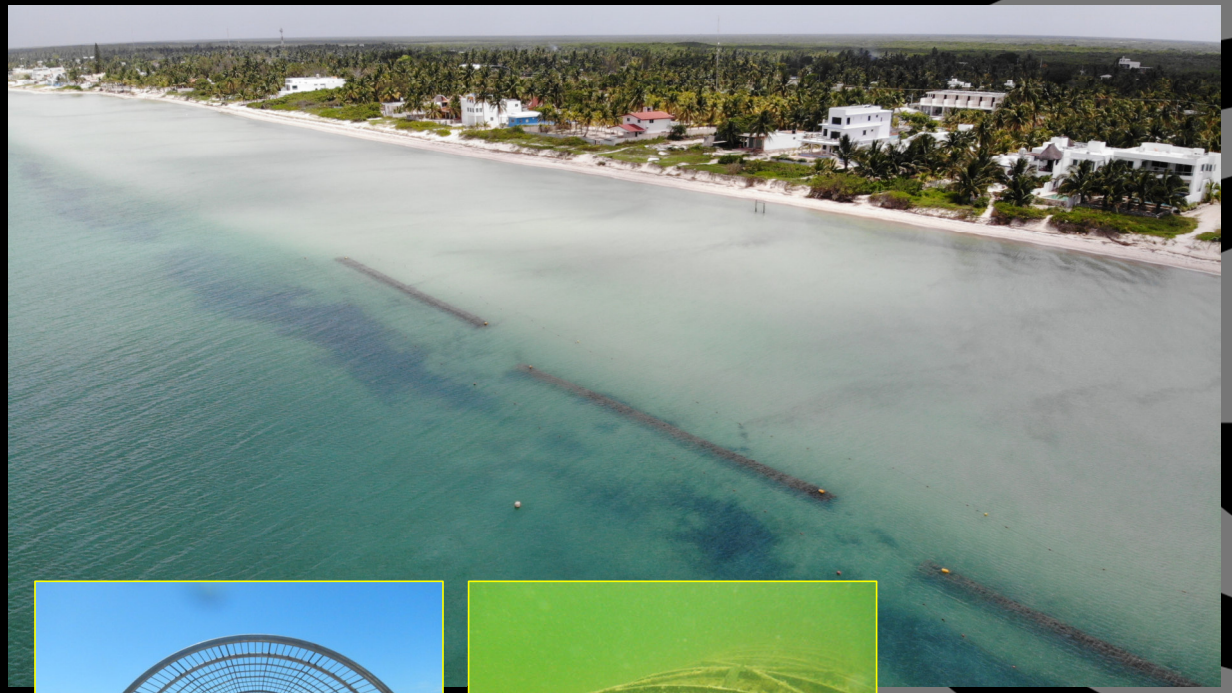
DEPLOYMENTS – TELCHAC, MEXICO

Project specs:

- 120m reef (50 units) - 4 sections
- 100m from shore ~1.7m deep
- First large-scale project
- Entirely powered using solar panels
- July 2021



Managing Solar Energy Supply



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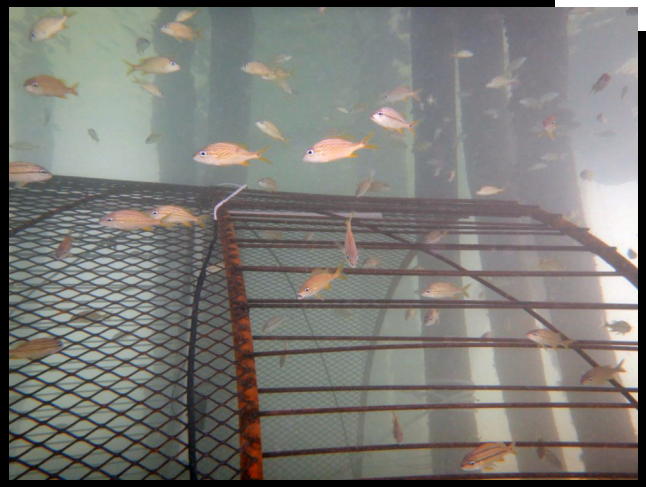
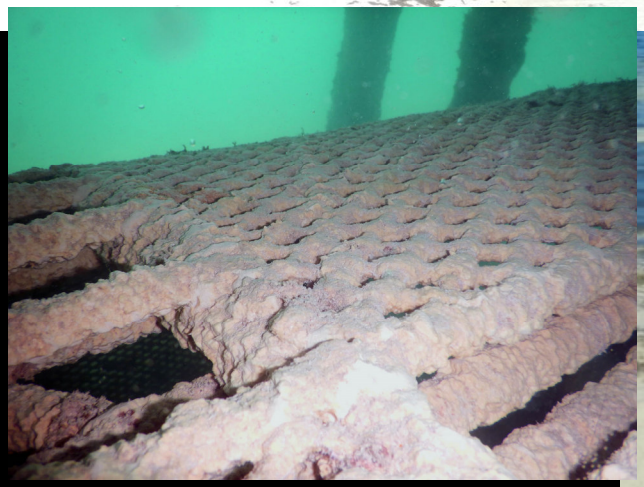
DEPLOYMENTS – ROYAL RESORTS, MEXICO

Project specs:

- 2.5m full scale pilot unit
- First installation with a Hotel
- Target 100m
- Dec 2021



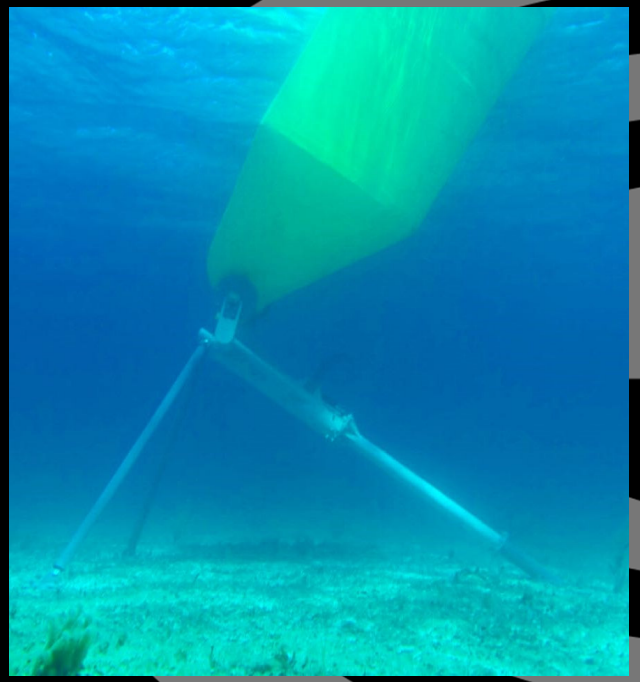


4 MONTH ROCK GROWTH

WAVE PADDLE – COZUMEL

Project specs:

- v2 pilot unit
- 4m water depth
- Aug 2018 to Mar 2019



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FUTURE PLANS

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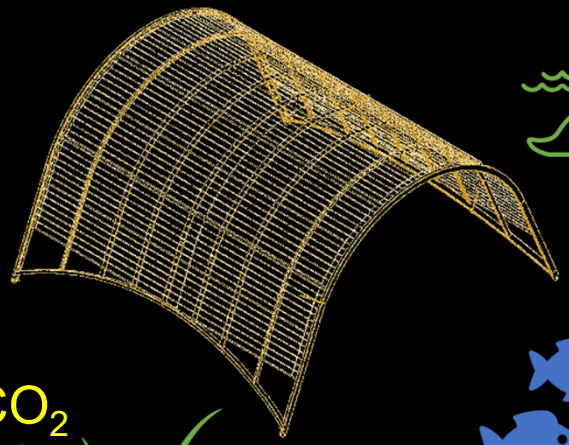
THE LIVING REEF – WHAT IS THIS?

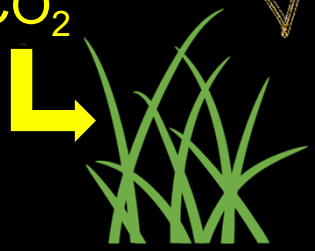
People

Corals or Oyster



Calcareous

CO_2



Sea Grass

Fish

Sensors

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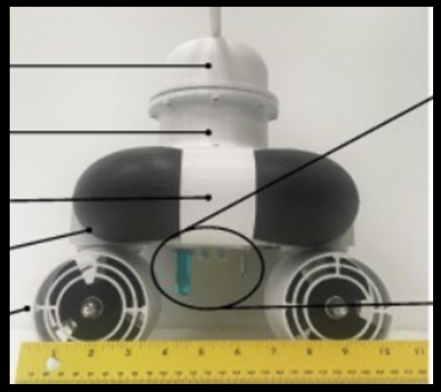
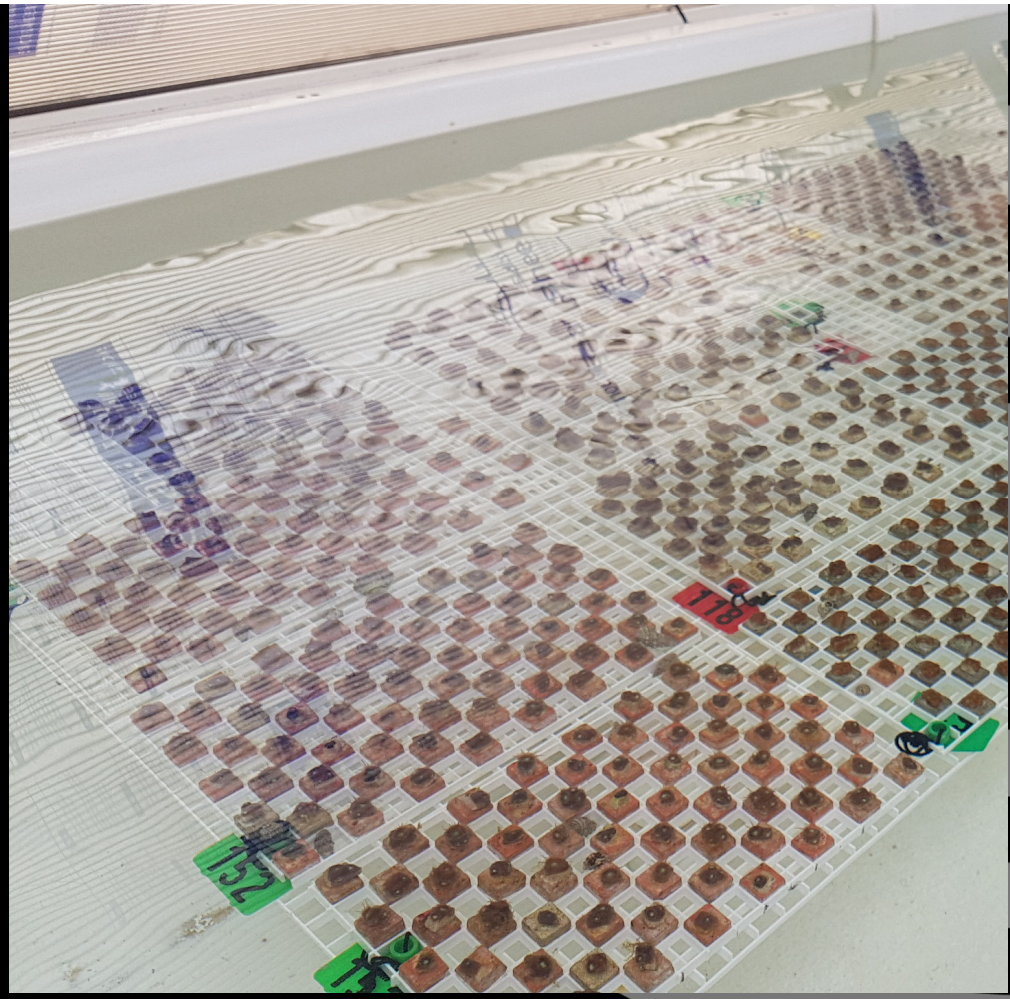
TECHNOLOGY – CORALS



Surface Water Sensor



- Coral Hatcheries
- Electrolysis enhanced growth
- Monitoring growth cycles
- Water quality sensing

CONANP COMISIÓN NACIONAL DE ÁREAS NATURALES PROTEGIDAS

INAPESCA

SEMARNAT SECRETARÍA DE MEDIO AMBIENTE Y RECURSOS NATURALES

Juntos transformemos Yucatán GOBIERNO ESTATAL 2018 · 2024 | SDS SECRETARÍA DE DESARROLLO SUSTENTABLE

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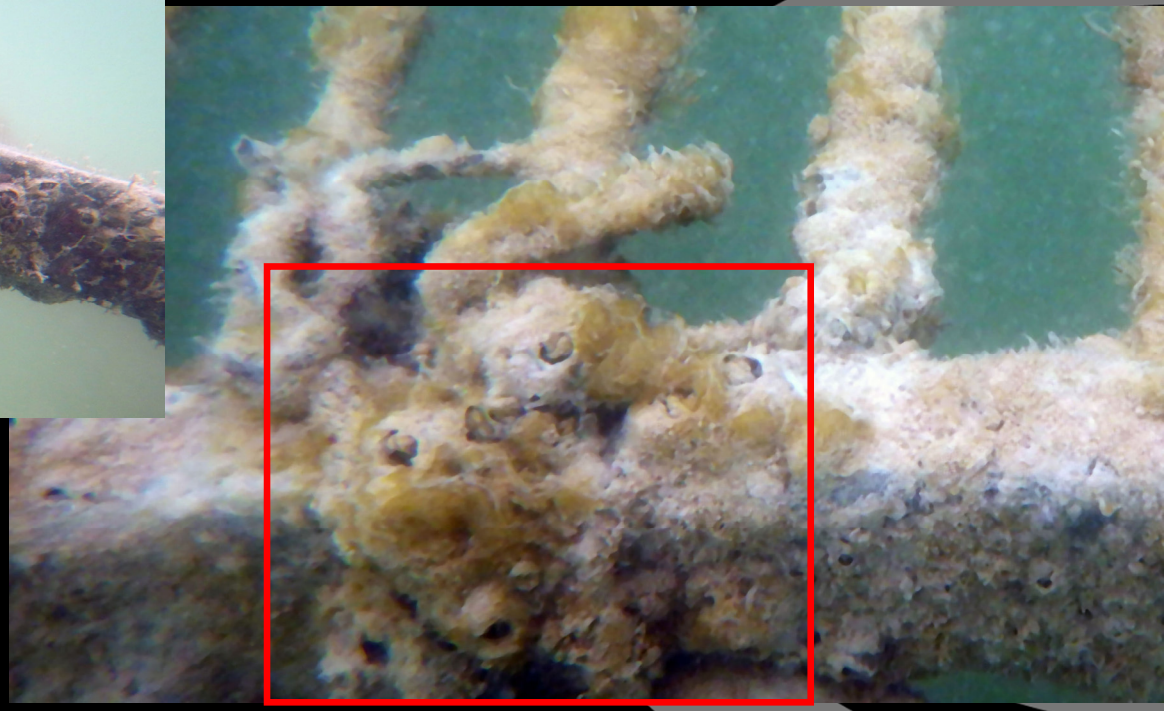
TECHNOLOGY – CALCAREOUS ORGANISMS



- Enhanced surface finishes
- Electrolysis to promote growth

MOLLUSKS GROWING ON TELCHAC REEF

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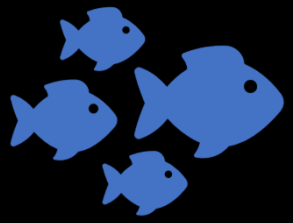
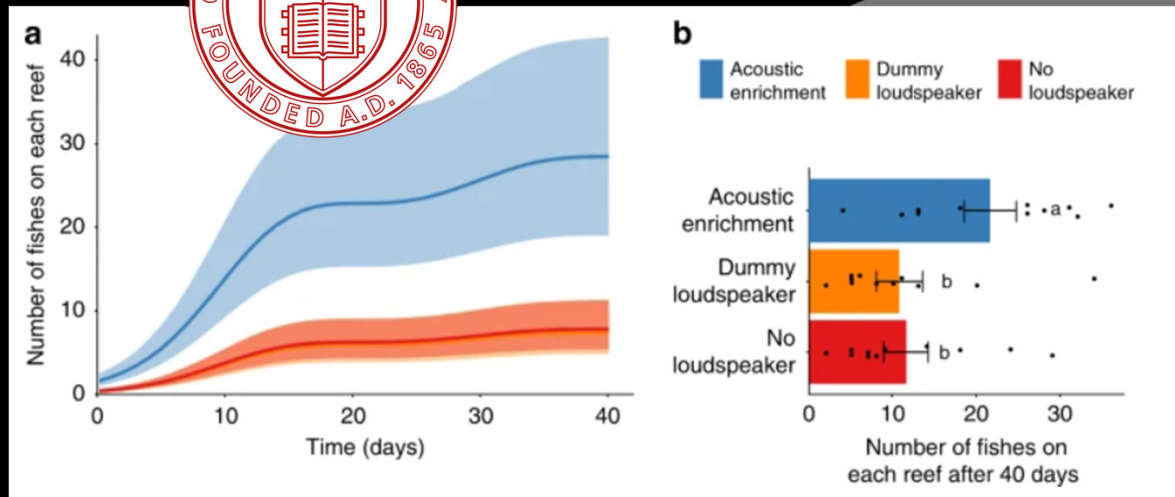
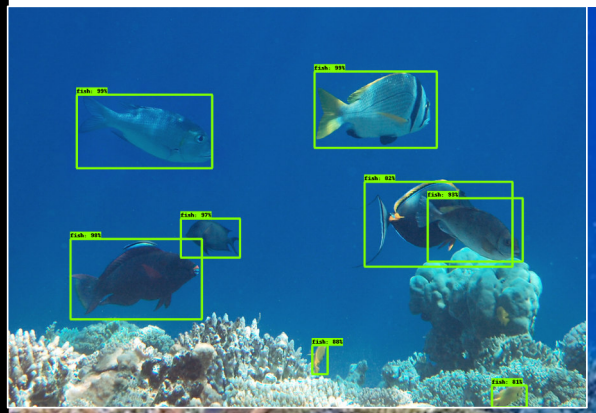
TECHNOLOGY – FISH

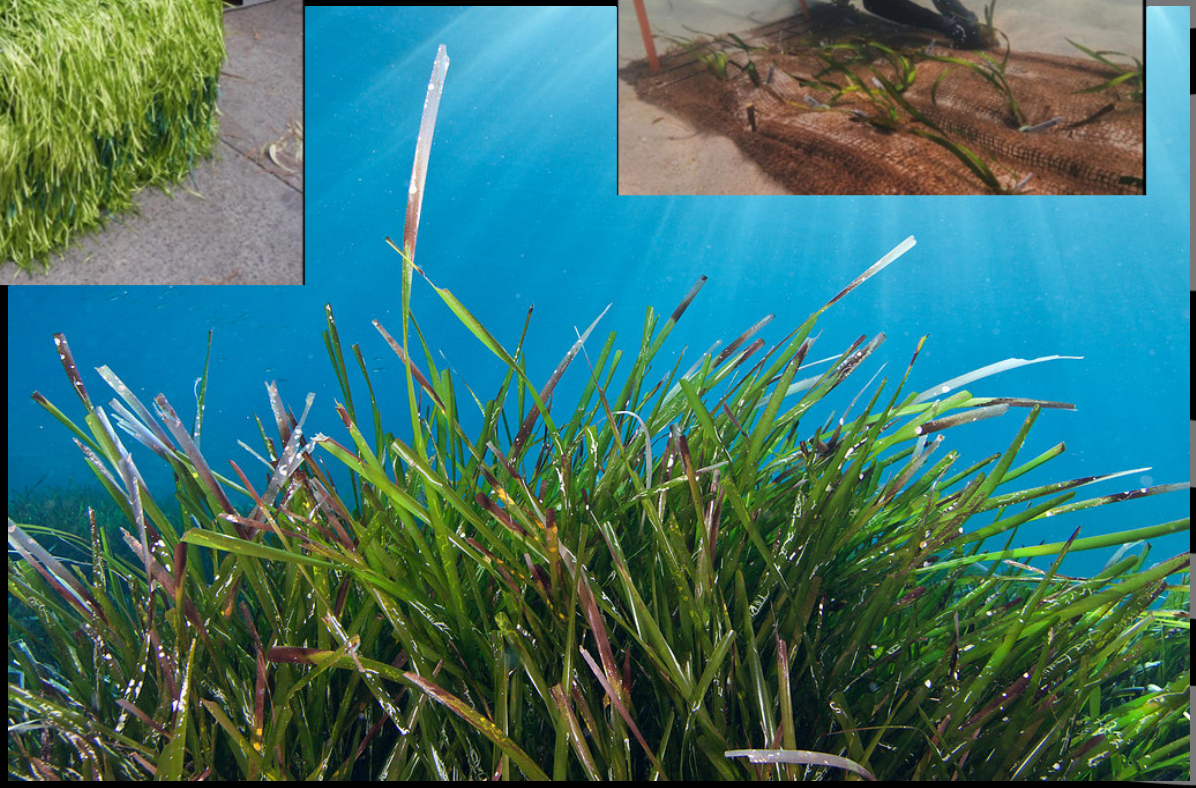


- Identify healthy sound signatures
- Broadcast attractive sound
- AI fish categorisation





TECHNOLOGY – SEA GRASS



- Seed injection
- Nurseries
- Anchoring of shoots to artificial structures

https://doi.org/10.3389/fmars.2020.00617

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TECHNOLOGY – PEOPLE

- Live Streaming
- Community Education

VIDEO STREAMING

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QUESTIONS ?