

# Supporting the transition from the Lab to the Sea

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18<sup>th</sup> November 2020



# WES Background



Developing cost  
competitive wave  
technology



Research, development &  
innovation programme  
funded by the Scottish  
Government



**13** Countries



Project collaboration  
across Europe and  
globally



**5** Programmes



**£39.6 million**  
committed  
expenditure

A subsidiary  
of



Highlands and Islands Enterprise  
Iomairt na Gàidhealtachd 's nan Eilean

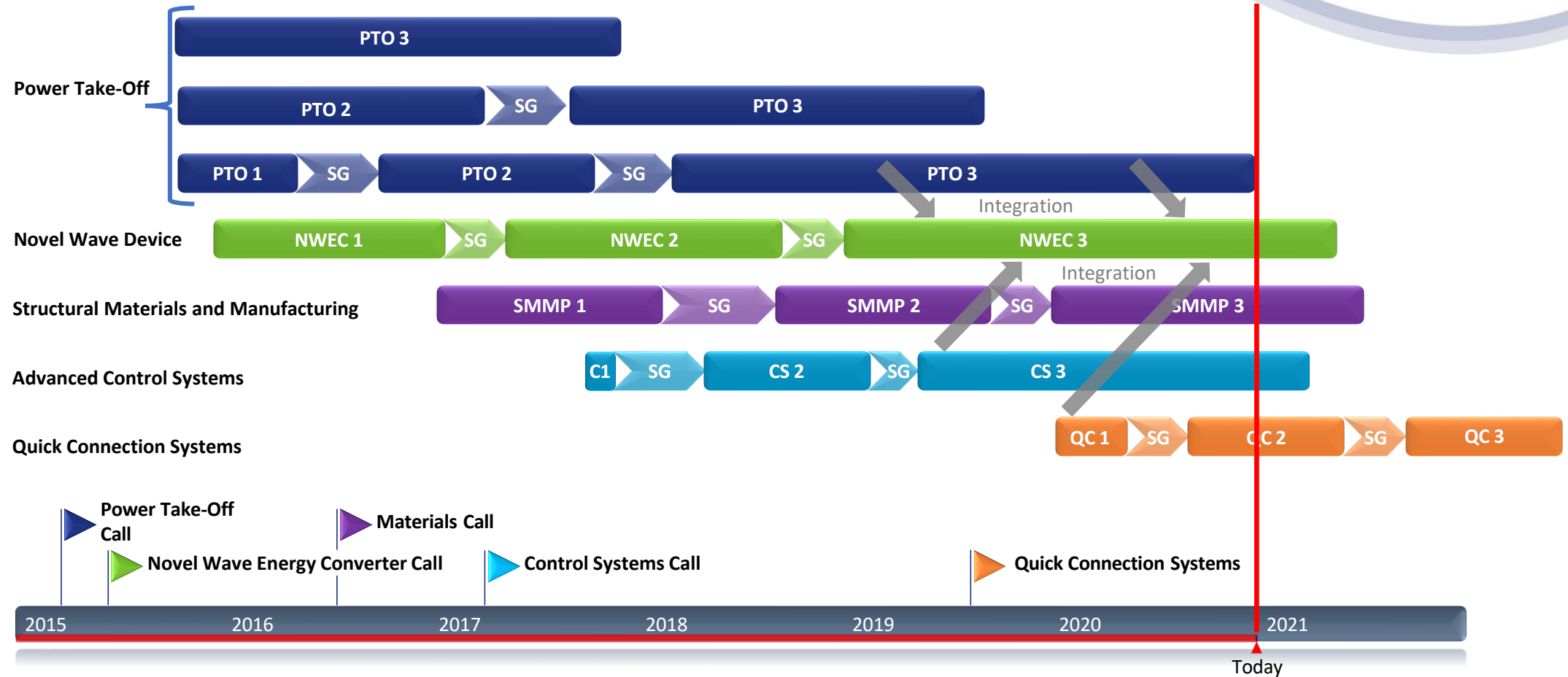


**230** Organisations



**96** Projects

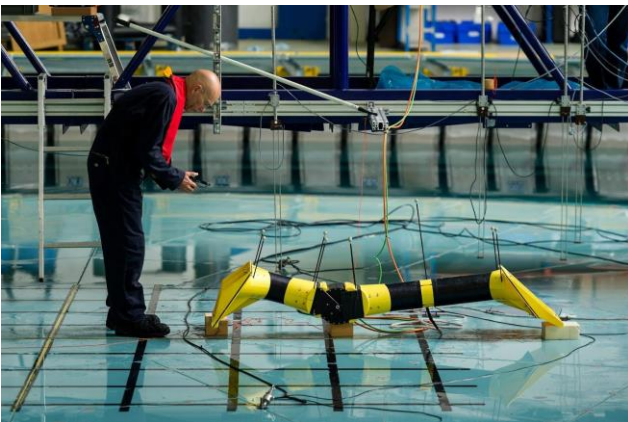
# WES Technology Programmes



# Technology development support

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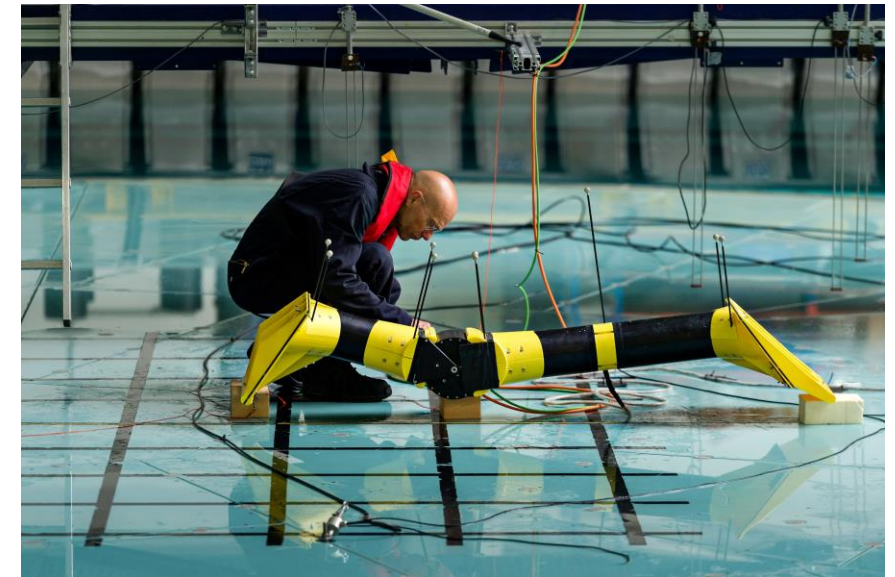
- Efficient and pragmatic technology development
- Robust design review process
- Appraised testing



# Stages 1 and 2 – Starting Small...

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- Controlled environment
  - Tank testing
  - Dry laboratory
- WEC scale varies from 1:20 to 1:50
  - Mandatory Sea States
  - Independent appraisal by third party
  - Compliant with TC114 62600-103
- Subsystem scale varies from 1:1 to 1:20



# Stage 3 – Large Scale

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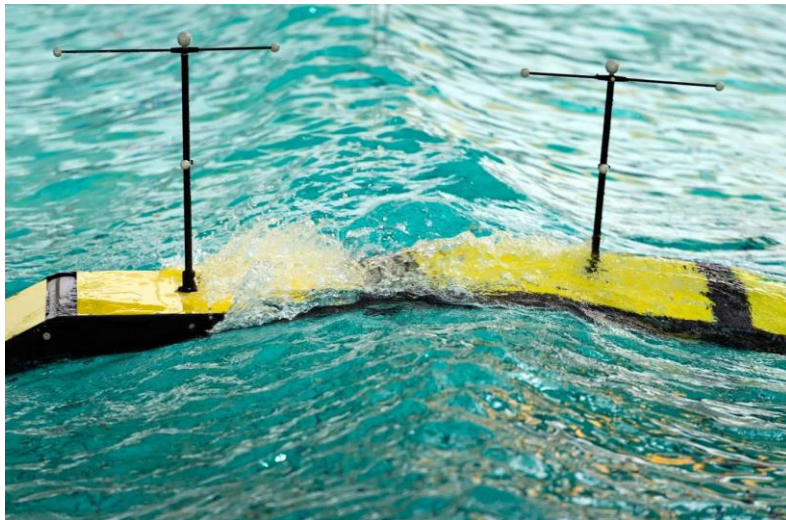
- Manufacture and test of 1:2 scale WECs / <1:1 subsystems
- Extensive lab based characterisation and validation
- Open-water testing at Scapa Flow
  - PTOs – 2018, 2019 (and 2020)
  - NWECS – Expected Spring 2021
- Outcomes:
  - Major risks mitigated,
  - Readiness for large-scale, pre-commercial testing,
  - Demonstration of operations & maintenance,
  - Demonstration of survival systems,
  - Estimate of full-scale WEC performance,
  - A product that a WEC developer can readily integrate



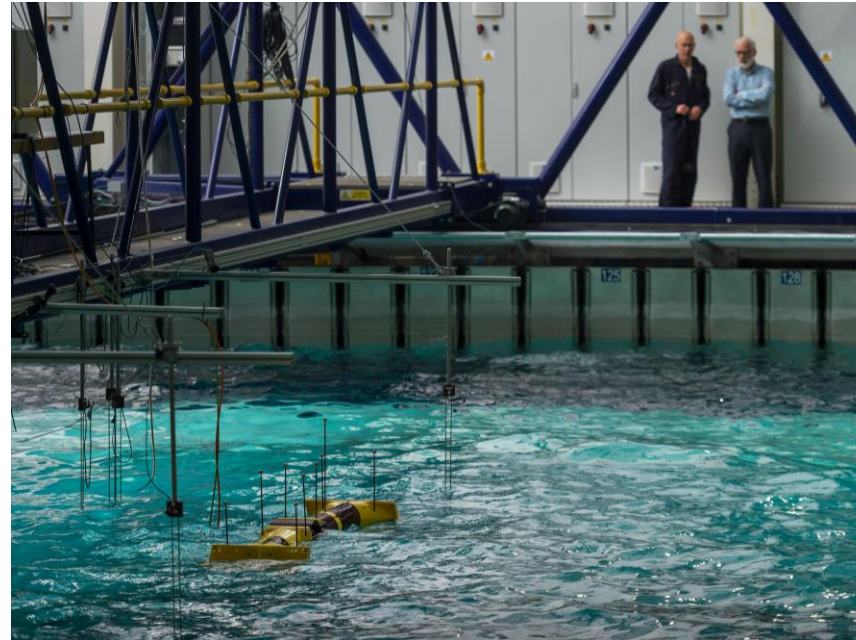


# Mocean – NWEAC *[In Progress]*

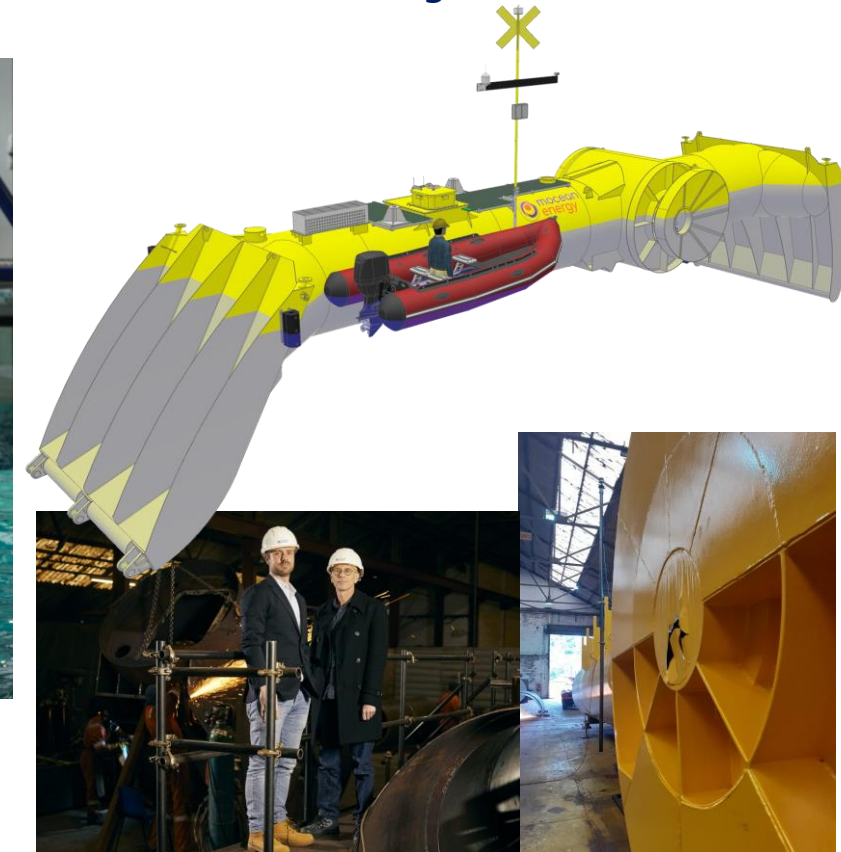
*Stage 1*



*Stage 2*

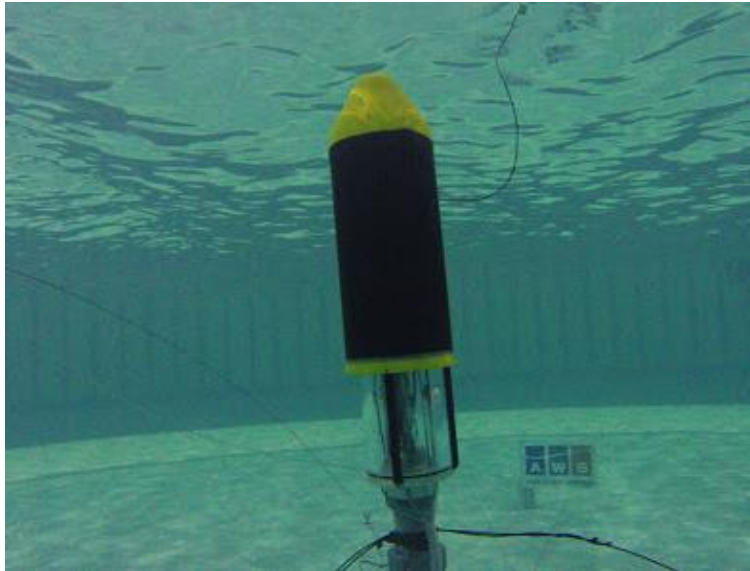


*Stage 3*

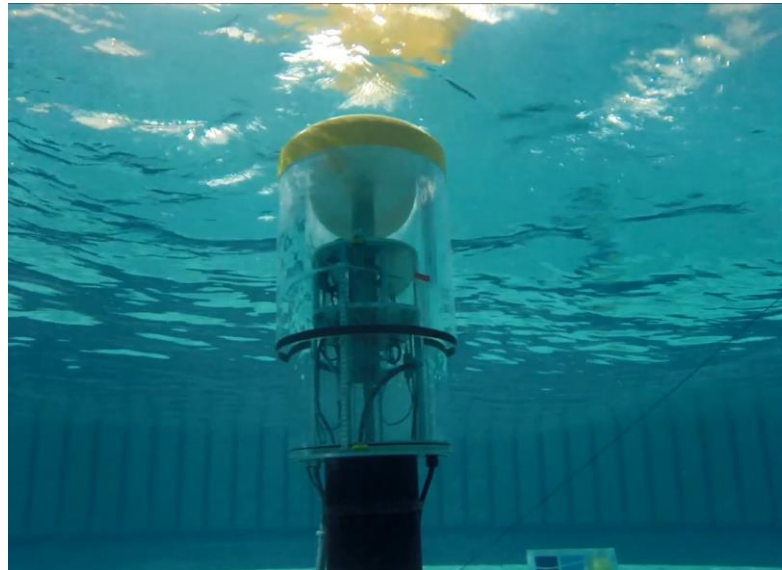


# AWS – NWEAC [In Progress]

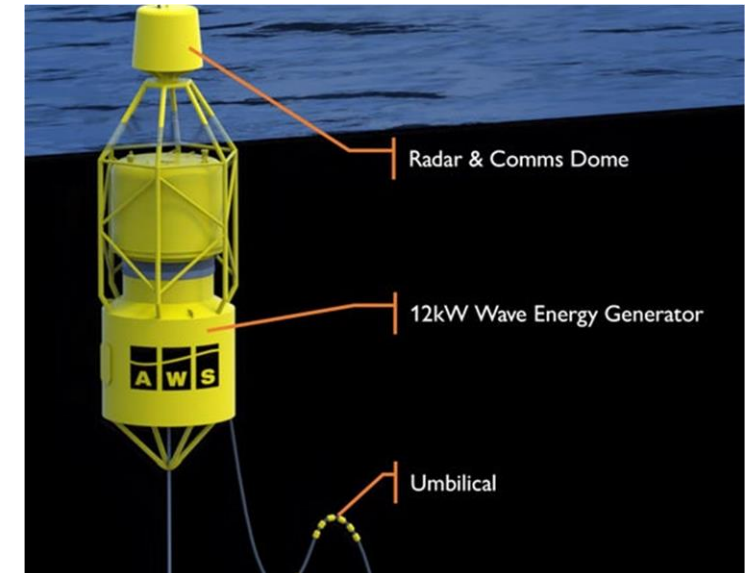
*Stage 1*



*Stage 2*



*Stage 3*





# Umbra – PTO *[Completed]*

*Stage 2*



*Stage 3*





# CorPower – PTO *[Completed]*

## Stage 3



# IEA-OES Task 12

## “International Technology Evaluation Framework for Ocean Energy”



- How to measure
- Clear definitions
- Evaluation methods
- Links to existing standards
- Wide review to gain international consensus



- 3-year project
- €8m budget
- 18 partners in 8 countries
- WES leading Stage Gate design tool work package
- Defining metrics for technology development process (TRL 1-9)



THE UNIVERSITY of EDINBURGH



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 785921



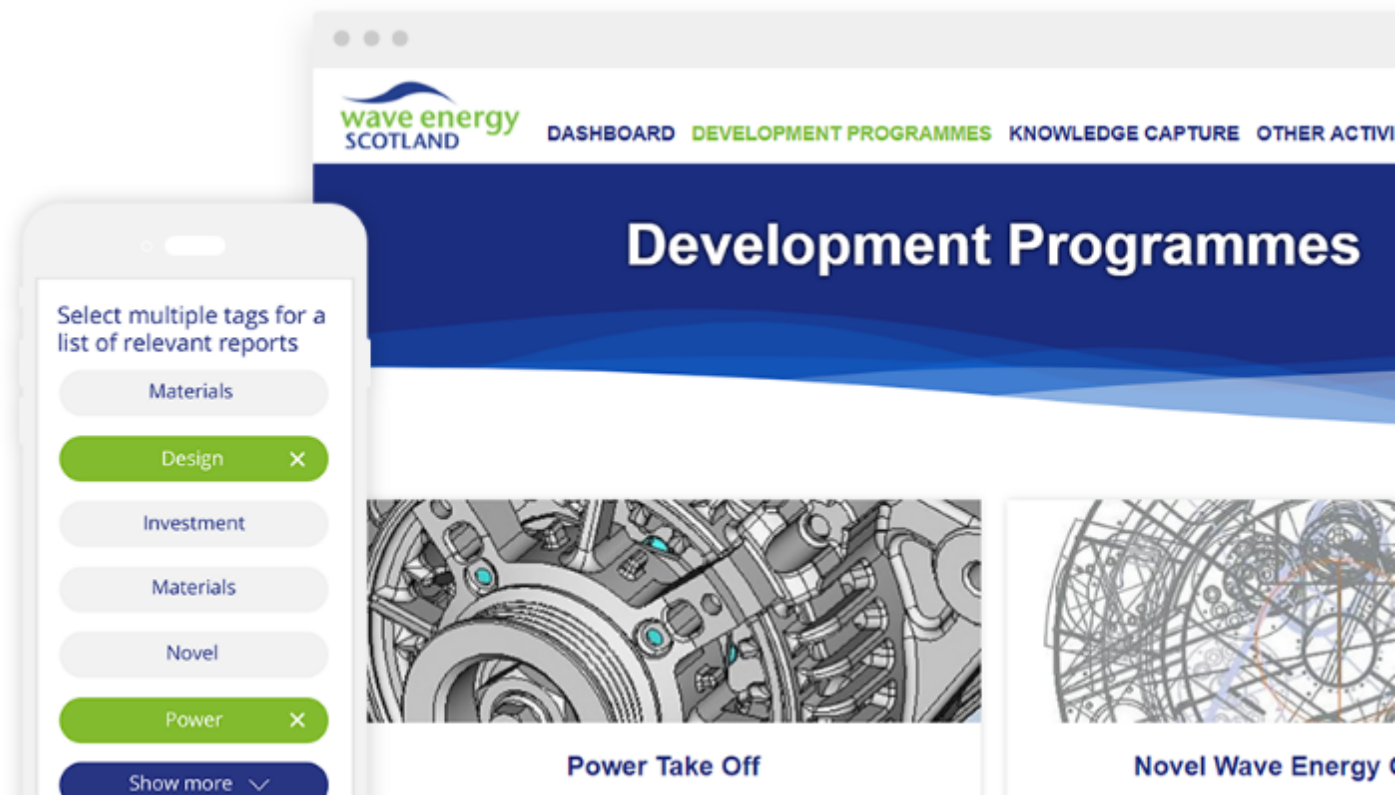


# Knowledge Library

Wave Energy Scotland is managing the most extensive technology programme of its kind in the wave energy sector. The Knowledge Library provides access to key information and documents generated through this world leading commercial and academic research & development.

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# From the Lab, to the Sea

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