

MeyGen Phase 1A Lessons Learnt - Operations Phase

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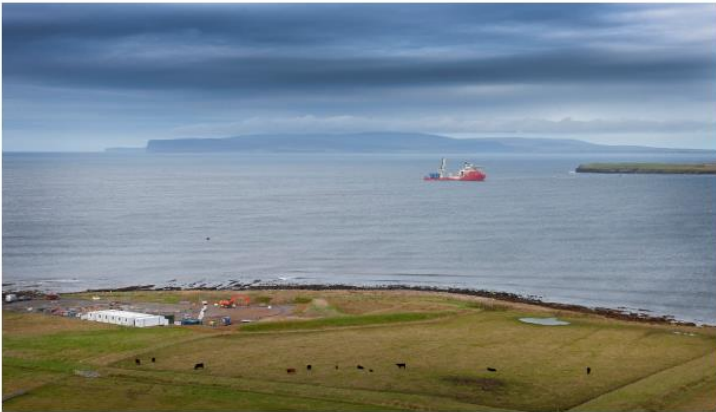
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CRAFTING THE FUTURE



Introduction

- Latest Lessons from MeyGen 1A
- Knowledge share - CES/SE expectation
- Focus on Operations Phase
- Assist the whole industry
- Not a critique of MeyGen or partners!
- Photographs courtesy of MeyGen
- On behalf of CES/SE (as FTA) & MeyGen

Lessons Learnt from MeyGen Phase 1A
Part 2/3: Construction Phase



'Siem Daya' undertaking cable works at the MeyGen site

May 2018



Technical Advisor Perspective: Lessons Learnt to date

- This is an update that has been given at All Energy every year since 2016
- Previous reports covered design, installation and early operations
 - Formal public report links below
 - As always, details are important

EIA Non-technical summary

<http://www.waveandtidalknowledgenetwork.com/ItemDetails.aspx?id=34049#>

Lessons Learned Reports:

[Lessons-Learnt-from-MeyGen-Phase-1a-Part-2-of-3-Design-Phase.pdf \(catapult.org.uk\)](#)

[MeyGen Lessons Learnt Full Report.pdf \(stackpathcdn.com\)](#)

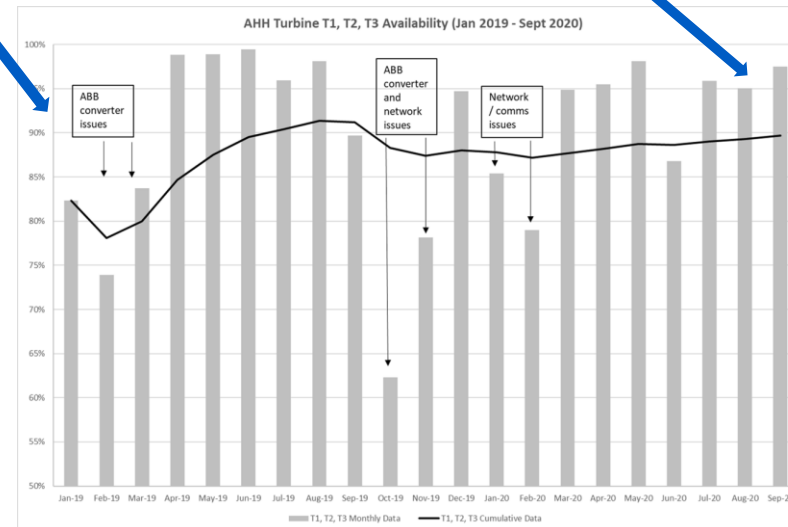
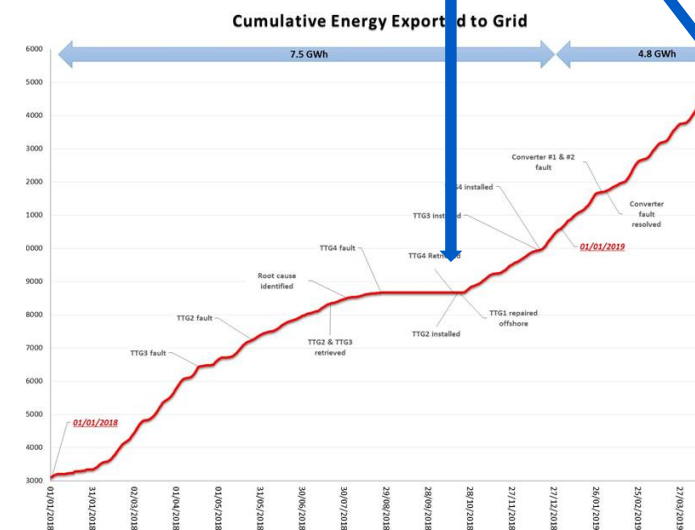
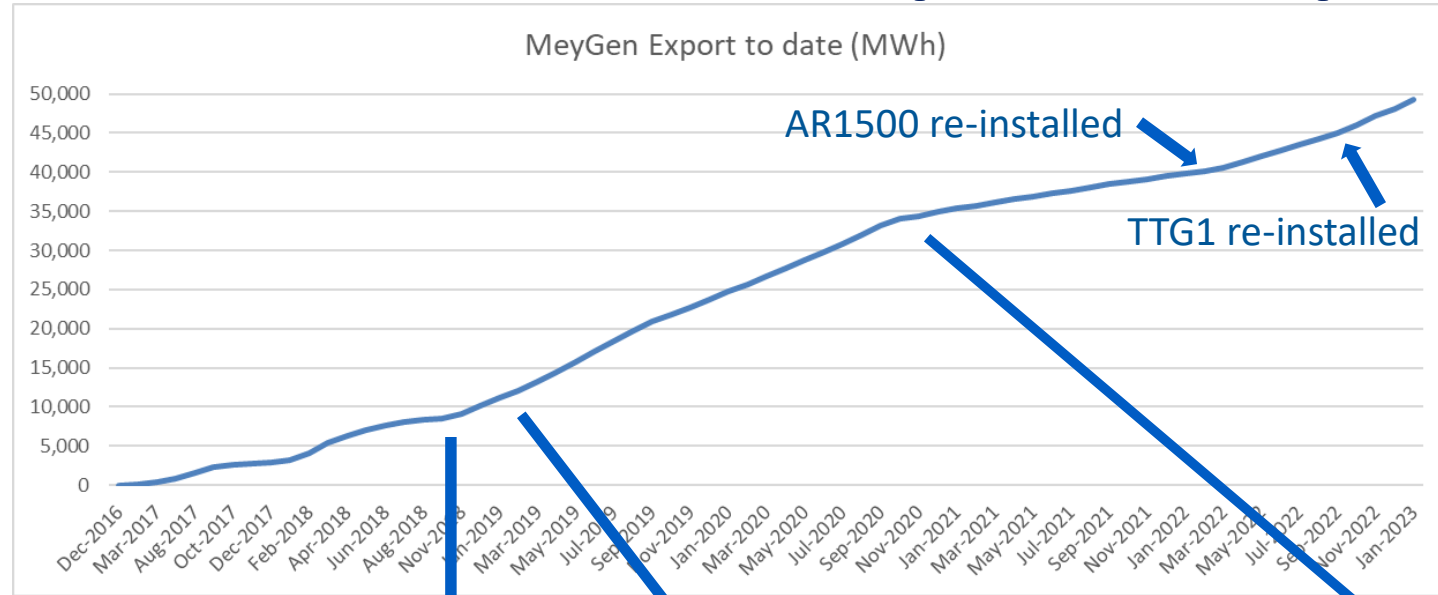
Technical Advisor Perspective: Health, Safety & Environment



- General lessons:
- Minimise crew transfers and mobilisation / demobilisation
- Use vessel crane to lift turbine, avoid cable tails on deck
- Production line approach - same people repeating tasks
- Review the design phase lessons
- Turbine movements into:
 - NRA and Vessel Management and Navigational Safety Plan
- In Oct 2021, there was a failure of a vessel crane wire c. 2t before turbine lifting load.
 - RIDDOR reportable, no risk to life but showed why have stringent procedures:
 - Lift plans have exclusion areas.



Technical Adviser Perspective: Operational Phase Data



- 50% of all global MEC GWh.
 - 75% of all UK tidal GWh for its operational phase: 2016-2022.
- Long-term CF: 36%.

Availability:

2018: 1-off serial QA fault on TTG1-3 & initial design fault on TTG4.

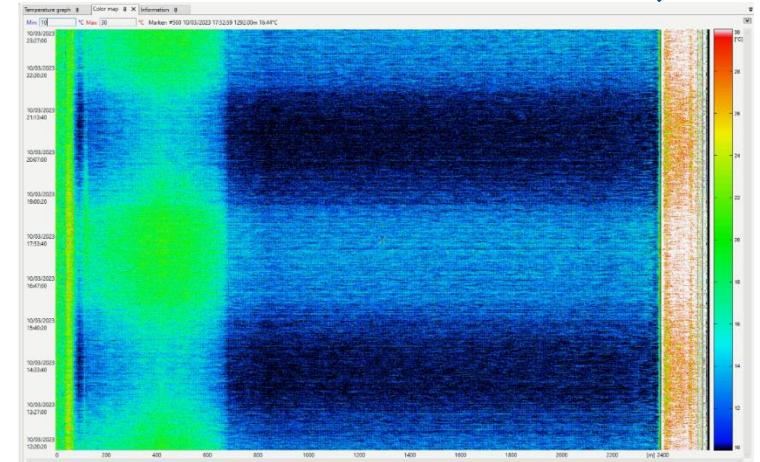
2019-Q3 2020: Averaged 90% availability on TTG1-3, with most downtime due to converter and network issues not turbine issues.

Q4 2020-Q1 2023: 2 AHH turbines removed for repair and early PM - 1st re-installed Sept 2022, 2nd due to be re-installed in Q2 2023. AR1500 also re-installed in March 2022.

TTG3: From 2019-2022, TTG3 generated 18GWh at an average > 92% full system availability. Availability was > 95% for 2021 and 2022. This needs to be replicated for other turbines.

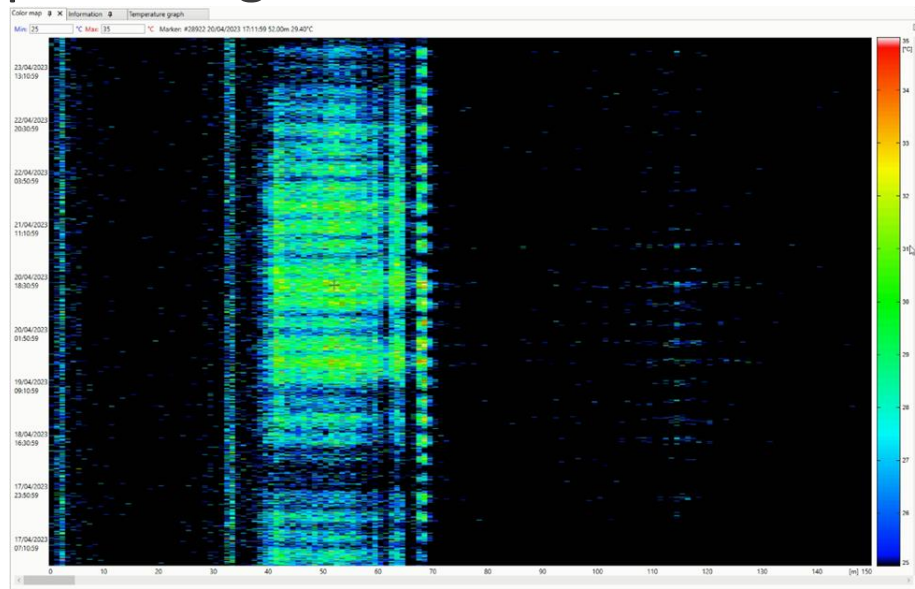
Technical Adviser Perspective: Operational Lessons (1)

- Faults: Apparently 'minor' components / faults can cause major downtime. Designing to Standards and ensuring QA/QC at all design, construction and installation stages will minimise the chances of such faults. Most faults to date have been 'minor' items.
- Insurance: Challenging 'niche' market. Working on two related TIGER projects, one with ASN related to gaining more confidence in offshore cable design and stability. ↩
- Wet-mate connectors far easier and cheaper to handle:
 - AR1500 designed from scratch with wet-mate
 - 1st AHH turbine retrofitted, with plans for 2nd and 3rd
- Devil is always in the detail, e.g.:
 - Test, test and test again - and make sure it's the right test

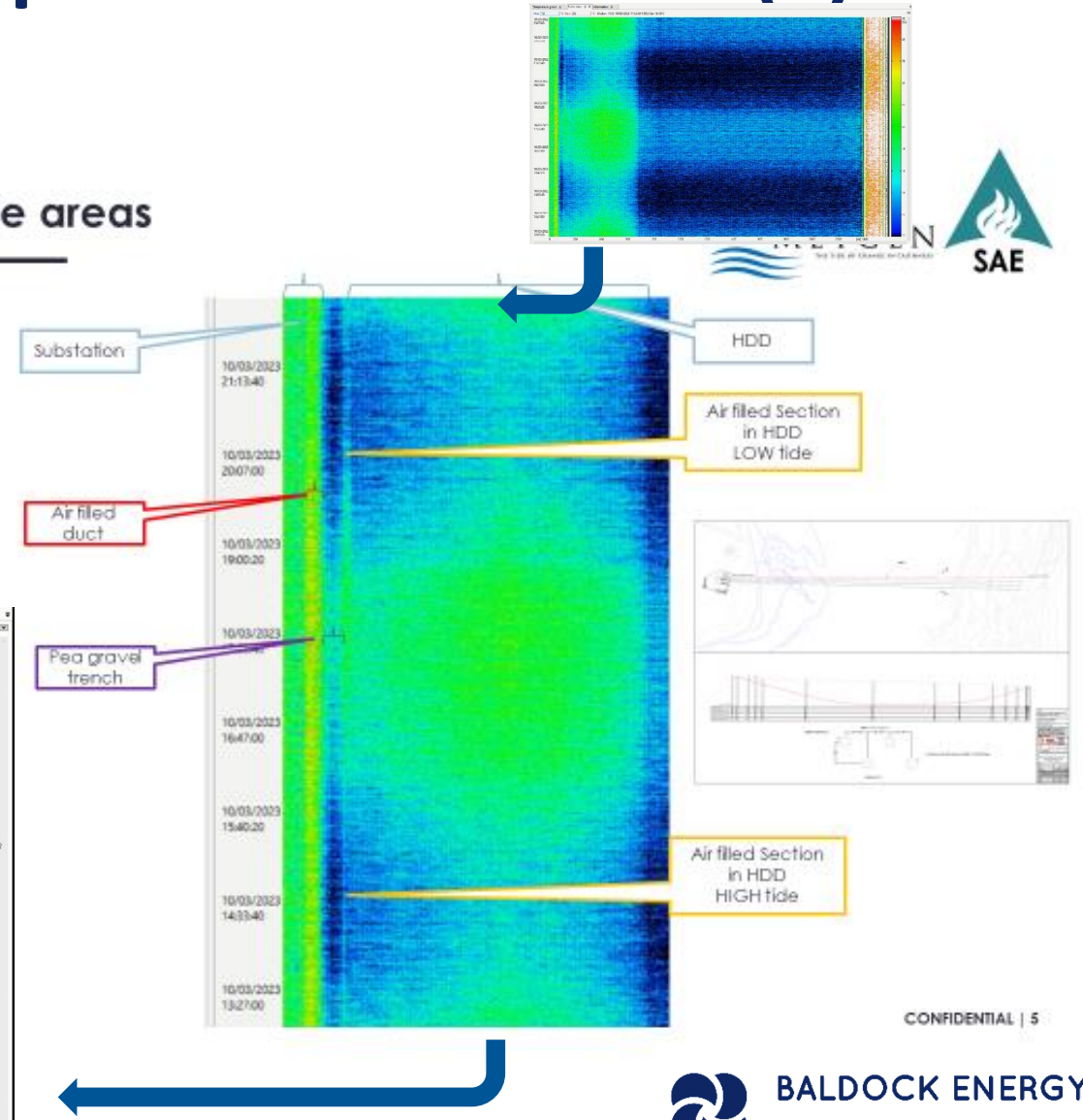


Technical Adviser Perspective: Operational Lessons (2)

- Offshore cable design example:
- Cable design determined by thermals
- Distributed temperature sensing (DTS) can check actual temp vs that predicted by design standards.
- Actual temp \ll design standards.

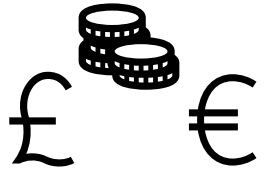


Cable areas



Technical Adviser Perspective: Optimising Operations (1)

- Be prepared (technically, commercially) for resource-intensive operations phase
- Resource 'buffer' is needed to ensure issues can be resolved without delay, as lack of resources can lead to delayed issue resolution, which leads to less available resources, which leads directly to other issues / delays etc.
- 'Spend to save' approach needed for early technology development:
 - Without resources for focused improvement, continued 'firefighting'
 - Tidal is no different – need to have required the resources available
- Resources can be 'contingent', e.g.:
 - Contractors, OEMs, etc. – but this needs robust up-front contractsAnd this can also apply to funding (e.g., debt drawdowns).



Technical Adviser Perspective: Optimising Operations (2)

- **Examples of recent/ongoing MeyGen optimisation work:**
 - Resource 'buffer' approach successfully developed
 - Repairs and maintenance more in-house (more staff/contractors)
 - 1st AHH turbine fitted with wet-mate (halving intervention costs)
 - Strategic spares reviewed and expanded
 - Focus switching towards improvement projects
- **Examples of future MeyGen optimisation work:**
 - Turbine performance optimisation:
 - Maximising availability (reducing wave impacts and rapid response)
 - Maximising performance (vs. lifetime loads)
 - Reducing import power (see 2022 presentation)
 - 2nd and 3rd AHH turbine fitted with wet-mate (halving intervention costs)
 - Review of whether brake needed to stop turbine from full power

Thank you for listening – get in touch with any questions

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