



EnFAIT



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ENFAIT ENABLING FUTURE ARRAYS IN TIDAL

Definition of Agreed KPIs



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I The Project

1.1 Introduction

A Funding Grant was awarded from the European Union’s Horizon 2020 research and innovation programme in January 2017 to demonstrate a grid-connected tidal energy array at a real-world tidal energy site, propelling tidal energy towards competing on a commercial basis with alternative renewable sources of energy generation – Enabling Future Arrays in Tidal (EnFAIT). This was in response to the call *LCE-15-2016: Scaling up in the ocean energy sector to arrays* to generate significant learning through demonstration of cost-effective tidal arrays.

This document is produced to set out the Key Performance Indicators (KPIs) for the EnFAIT array build, test and construction. It is to be submitted to satisfy deliverable D5.2 of the EnFAIT project and to be also made available for public dissemination.

2 Key Performance Indicators (KPIs)

KPIs are measures that cover the most important aspects of the project delivery to demonstrate the success level of performance of the project in achieving its goals. They track performance throughout the project giving visibility of progress.

They are established at the beginning of a project, or a phase of project, and must be directly related to the project goals. If all KPIs are successfully met, then this means that the project and its goals have also been successfully met.

KPIs can be **lagging indicators** simply informing how a project has performed, such as financial metrics. They have no value in predicting future performance. KPIs could also be **leading indicators** which can offer some guidance on future project results, such as operational metrics. Ideally a project has a combination of lagging and leading indicators.

2.1 SMART KPIs

To be meaningful and have use, the defined KPIs must provide information that can be positively acted upon. They must be clear and appropriate for the project and for those working on the project. As far as possible, the KPIs should use SMART criteria, as follows :

- Are they **Specific** for the project?
- Can they **Measure** progress of project goals?
- Are they realistic and **Achievable**?
- Are they **Relevant** for the project?
- What is the **Timeline** for achieving the project goals?

2.2 KPI categories

There are many KPIs that can be defined for a project, but they can be typically summarised into categories, as follows.

2.2.1 Health & Safety

These KPIs typically measure aspects and risks concerning health and safety within the project delivery, which can include near-miss incidents.

2.2.2 Financial Performance

These KPIs usually measure how much the actual project cost spend varies against the planned cost budget, the cost baseline.

2.2.3 Schedule Performance

These KPIs typically measure how long it takes to complete a certain task or activity against a planned timeline. They could also measure whether a task has been completed by a defined deadline date.

2.2.4 Operational Performance

These KPIs cover the aspects of quality and efficiencies in project delivery. They can include measures covering rework and efficiencies in the production of multiple items.

2.2.5 Resource Performance

These KPIs usually measure the amount of time spent on the project by the team members against a planned resource budget, and therefore gives an indication of resource effectiveness.

3 EnFAIT procurement, assembly, test & construction phase

Work Package 5 of the EnFAIT project is the procurement, assembly, test and construction of the new aspects of the Shetland Tidal Array in Bluemull Sound, including turbines, cables, onshore station and subsea hub.

A summary timeline of this phase of work is shown in Figure 1, against which the project Schedule Performance KPIs will be defined and then measured.

Figure 1 : Summary timeline of EnFAIT work package 5 activities

		Procure	Assembly	Test	Install			
Tidal Array element	Activity	2018	2019				2020	
		Q4	Q1	Q2	Q3	Q4	Q1	Q2
Turbine T4								
Turbine	Procurement	■	■	■				
	Assembly				■			
	Test				■			
	Construct / Install				■			
Substructure	Procurement	■	■					
	Assembly			■				
	Construct / Install				■			
Cables	Procurement		■	■				
	Assembly			■				
	Test				■			
	Construct / Install				■			
Shore Station	Procurement		■	■				
	Assembly				■			
	Test				■			
	Construct / Install				■			
Turbine T5,6,7								
Turbines	Procurement				■	■	■	
	Assembly						■	
	Test							■
	Construct / Install							■
Substructure	Procurement				■	■		
	Assembly						■	
	Construct / Install							■
Cables	Procurement				■	■		
	Assembly						■	
	Test						■	
	Construct / Install							■
Shore Station	Procurement				■	■	■	
	Assembly						■	
	Test						■	
	Construct / Install						■	
Subsea Hub	Procurement				■	■		
	Assembly						■	
	Test						■	
	Construct / Install							■

4 EnFAIT KPIs

The EnFAIT KPIs for this phase of the project have been identified to provide a common approach for measuring performance of the production of the new tidal energy turbines and array from 2018 to 2020. Each of the KPIs will be monitored, assessed and reported on a RAG (red / amber / green) basis against the target outcome for each KPI. These are summarised in Table 1.

Table 1 : Identified KPIs for EnFAIT work package 5 activities

KPI #	Title	Description	Timeline	Target	Green	Amber	Red
Health & Safety							
KPI 1	Reportable Health and Safety Incidents	Number of health and safety incidents that were RIDDOR-reportable from Nova Innovation WP5 activities	Oct-18 to Jun-20	Zero in any rolling 12 month period	Zero	One	More than one
KPI 2	Lost Working Days	Number of lost working days due to Nova Innovation WP5 related H&S incidents	Oct-18 to Jun-20	Less than 9 working days per 10,000 total working days in any rolling 12 month period	Less than 9	9-12 days	More than 12 days
Financial Performance							
KPI 3	Nova Innovation Material Costs	Percentage ratio of actual material costs incurred by Nova Innovation for all array materials, against material cost budget.	Oct-18 to Mar-20	At least 10% reduction from material cost budget	Less than 90%	90-100%	More than 100%
Schedule Performance							
KPI 4	Nova Innovation (long lead / high value) Materials Purchase Orders Placed	Percentage ratio of identified long lead/high value materials POs ordered by Nova Innovation on or before their planned dates	Oct-18 to Dec-19	At least 95% of identified POs placed on or before their planned dates	95-100%	85-95%	Less than 85%
KPI 5	Nova Innovation (long lead / high value) Materials Purchase Orders Delivered	Percentage ratio of identified long lead/high value materials POs delivered to Nova Innovation on or before the supplier delivery dates on the POs	Oct-18 to Mar-20	At least 95% of identified POs delivered on or before their supplier delivery dates	95-100%	85-95%	Less than 85%
KPI 6	Turbine system commissioned and operational	Actual completion date for the commissioned turbine being fully operational against the planned completion date for each new turbine	Aug-19 to Jun-20	On or before the planned completion dates	On or before planned date	1-28 days late	More than 28 days late

KPI #	Title	Description	Timeline	Target	Green	Amber	Red
Operational Performance							
KPI 7	Materials Rejects (for Nova Innovation long lead / high value POs)	Percentage of identified long lead / high value POs that require Nova Innovation to reject products or materials for re-work, or request returns of products based on receipt of a bad or out of specification product for replacement	Oct-18 to Mar-20.	Zero materials orders rejected	0-5%	5-10%	More than 10%
KPI 8	Manufacturing Cycle Time for turbines	Efficiency of manufacturing : percentage ratio comparing the durations for manufacturing each of the new tidal turbines from the time the main material order is released to the full system on site commissioning	Oct-18 to Jun-20	Each turbine manufacturing duration is at least 5% less than the previous turbine produced	Less than 95%	96-105%	More than 105%
Resource Performance							
KPI 9	Nova Resource levels against budget	Percentage ratio of actual resource levels utilised by Nova Innovation in producing the new tidal energy array elements, against their planned resource budgets	Oct-18 to Jun-20	At least 10% reduction from each planned resource budgets	Less than 90%	90-100%	More than 100%

5 Monitoring & Reporting

Nova Innovation is the partner in the EnFAIT consortium leading the delivery of work package 5 and consequently all of the KPIs for this project phase will be monitored and recorded by Nova Innovation.

The KPIs and associated data will be reviewed and assessed by Nova Innovation on a monthly basis as the project progresses.

Once the production and construction of the new turbine T4 has been completed in 2019, Nova Innovation will produce a consortium 'KPI Report' which will only be made available to the consortium partners (and the European Commission) to assist in learning for the future activities.

A second consortium 'KPI Report' will be produced by Nova Innovation once the production of the new turbines T5, T6, and T7 has been completed in 2020, which will also be only available to the consortium partners (and the European Commission).

5.1 Lessons Learned

A key part of the EnFAIT project is to produce information and learning for dissemination to the tidal energy sector. An important project output is therefore Lessons Learned highlighting aspects that can be shared outside of the consortium.

EnFAIT will produce a publicly available document, the 'First Turbine Lessons Learned Report', highlighting the benefits and challenges from the build and commissioning of the T4 turbine in the tidal array. This is planned to be made available in autumn 2019.

The project will produce a second publicly available document, the 'Series Phase Lessons Learned Report' highlighting learning from the production of turbines T5, T6 and T7 of the array. This is planned to be made available in summer 2020.

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