



## Power Take-Off System for a Subsea Tidal Kite

D7.8

### ► Dissemination Report

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## Executive summary

This report is a deliverable of the PowerKite project, a Horizon 2020 project funded by the European Union's Horizon 2020 research and innovation programme. The PowerKite project will design, build and deploy a power take-off system (PTO) for novel tidal energy concept called the Deep Green technology.

The dissemination report describes how the PowerKite consortium has communicated the project and achieved results to different target groups throughout the project lifetime.

Throughout its 36-month lifetime, the PowerKite project has regularly disseminated information with the purpose of raising awareness and promoting the project, to inform and engage target audiences as well as exploiting the results achieved.

Dissemination has been performed mainly through presentations and papers at scientific, industry and related conferences, tradeshows and similar events. In addition, scientific and journal papers and articles have also been instrumental to the dissemination of the project.

The performed dissemination activities have been evenly distributed between the different main target groups that were identified at the start of the project: private industry players such as utility companies and subsystem suppliers, the scientific community, public authorities, and society at large through media and the general public.

The most noticeable dissemination activity through media publicity was the filming and broadcasting of a television documentary report on the PowerKite project by Euronews in May 2017. The report was part of a programme series called Futuris on European science, research and innovation.

It aired for a week's time on the Euronews cable network channel, broadcasted to 400 million households in 155 countries worldwide. It has also been available to watch on demand at Euronews' website and YouTube channel since May 2017. The EuroNews dissemination activity is therefore estimated to have reached some 4 million people worldwide.

The Powerkite project was also selected to be showcased at the technical exhibition of the Clean Energy Ministerial 8 (CEM8), 6–8 June 2017, Beijing, China.

## Background and introduction

The PowerKite project designs, builds and deploys a power take-off system (PTO) for the Deep Green subsea tidal kite developed by Minesto. Deep Green is a next generation tidal device that radically changes the way in which energy is harvested and allows access to many sites that were previously thought to be uneconomical. The device has the potential to achieve a step change of cost reduction compared to fixed turbines and to open up the exploitation of potential energy production from low energy sites, where no other technologies are known to be efficient.

The PowerKite project aims at reducing the time to market for the Deep Green concept. Deep Green's unique characteristics make it possible to reach twice as much of Europe's sites compared to other tidal energy converters. The project focuses on the PTO system of the tidal energy converter, where most of the performance/reliability improvements can be achieved.

This document, D7.8 Dissemination Report, is to be read in conjunction with the D7.9 Innovation Management Report and D7.10 Exploitation Plan Final of the PowerKite project. The Dissemination Report together with the Innovation Management Report are published at the end of the project, M36, whereas the Exploitation Report Final was delivered at M30.

- The Dissemination Report is aimed at describing the strategy and concrete actions taken by the consortium to communicate on its activities and the dissemination of the PowerKite project results.
- The Exploitation Plan Final summarizes the strategy and concrete actions related to the exploitation of the PowerKite project results.
- The Innovation Management Report define the strategy for how the PowerKite project IPR will be managed, in accordance with the IPR provisions of both the Grant and Collaboration Agreement and the IPR registry resulting from the project.

Dissemination relates to creating awareness of the project and making the results of the project visible. Exploitation relates to ensuring the use of the project results during and after implementation of the project and innovation management relates to the management of intellectual properties, from idea to innovation, derived from the project.

### Dissemination strategy, objectives and purpose

The PowerKite project's dissemination strategy has been to communicate information about the project and achieved results to relevant target groups, via relevant channels with the right timing.

Since the PowerKite project is executed by a unique collaboration of the tidal energy supply chain, that is both complementary and interdisciplinary, the strategy has been to use the existing networks and marketing/corporate communications resources of each consortium partner for effective dissemination.

The consortium partners have together identified appropriate dissemination activities of the project and results achieved. In addition, each industrial and academic partner has developed and initiated their own individual dissemination activities based on their contributions to the project and their business development research strategy.

The overall objective of the dissemination report has been to transmit useful and useable knowledge to appropriate target audiences, including research communities, practitioners, the public, policy makers and regulatory bodies. Each of these target audiences has its own particular needs, which has created the need for tailored and specific dissemination activities. In the application for the PowerKite project (document Power Kite Annex 1 Part B 2015-11-19, p. 27ff), expected impacts of the project was identified and described. Based on those expected impacts, relevant target audiences were identified and are described on the next page. In this dissemination report and the enclosed dissemination log, tools and activities for how and with which message these target audiences has been reached are specified.

The purpose of the dissemination activities has been to:

- Raise awareness – Develop high visibility of the PowerKite project
- Promote – Inform all interested communities about the PowerKite project and the Deep Green concept
- Inform – Make the outcomes developed through the PowerKite project available to the different target audiences
- Engage – Motivate the PowerKite target audiences to provide inputs and feedback
- Exploit – Enhance the potential of Deep Green and thus of the project activities

## Target audience

In order for the PowerKite project to have a far-reaching impact, the dissemination plan has encompassed all relevant stakeholders identified in Table 1. In addition, the project dissemination strategy put a specific focus on utilities. In this context, the consortium requested the participation of Engie Lab Lorelec which could open dissemination opportunities towards the utility industry.

Category	Target Audience	Why them?	What's in it for them?	Main dissemination channels that have been used throughout the project
Private industry	Utilities	There is a lack of practical experience and performance data collected from open sea deployment, preventing industrial stakeholders to develop full-scale arrays	Learn from practical experience and collected performance data to plan for grid integration, operation and maintenance of tidal energy plants	Industry conferences and events Internal utility events Industry media Internal newsletters/magazines
	Subsystem suppliers		Learn from practical experience and collected performance data in order to improve the technology performance of subsystems	
	Engineering, Procurement and Construction companies		Learn from practical experience and collected performance data to plan for the construction of tidal energy plants	
Scientific community	Tidal energy researchers	Models that have been developed only consider the first generation tidal power plants	Access a reference testing facility for second generation tidal kite performance	Scientific and industry conferences and events Academia-related events Papers, posters and presentations Industry media
	Environmental interaction researchers		Develop new models for environmental interaction assessment of second generation tidal kites	
Public authorities	National and Regional authorities	The EC has recently started to explore the possibility of combining funding for research and demonstration projects and structural funds	Learn from the first project to combine national funding, direct EC funding and indirect EC funding in order to reach commercial stage	Industry conferences Policy events EU-affiliated news sites Industry media Website
	European Commission			
Society at large	Media	Media have so far provided more coverage to more mature sectors (wind energy and solar energy)	The project will provide valuable scientific data to raise awareness about the enormous potential of ocean energy	News & trade media EU-affiliated news sites Website
	General Public			

Table 1: Targeted audience of the PowerKite project

## Dissemination activities

In this section the PowerKite project's dissemination activities are summarised both by partner and by type of dissemination.

For a complete list of performed dissemination activities, please refer to the Final Dissemination Log for the PowerKite project (Annex 1).

Partner	Activities during project phase
ROC	Has promoted the project and project results through paper and presentation at the International Conference on Ocean Energy, to the ocean energy community via workshop in Brussels as well as within the Midroc group (3,200 employees). It has developed the project website and project dissemination material.
LAB	Has presented the project at conferences on the subject of ocean energy such as the International Conference on Ocean Energy. It has leveraged ENGIE membership in trade body Ocean Energy Europe to reach out to all its members. It has also leveraged ENGIE participation into the European Commission initiatives on Ocean Energy to reach out to the stakeholders involved. LAB has shared project results within the ENGIE Group (renewable energy seminar, internal and external, client oriented, publications).
MIN	Has presented the project at ocean energy-related conferences such as Ocean Energy Europe. It has also presented the research of the PowerKite project at user events such as Gothenburg Region OpenFOAM User Group meeting. It has written press releases and news articles related to the Deep Green technology and the PowerKite project, offered to relevant industry magazines and news sites such as ReNews, Ny Teknik and technology/engineering/energy-related news websites.
CHA	Has involved one PhD candidate in the project, who is expected to defend his licentiate degree soon after the project completion. CHA has published several conference papers and presented at international conferences, such as EPE 2017, ICEM 2018 and ECCE 2018, as well as regional seminars and workshops such as Elkraftdagen 2018 in Gothenburg. CHA has also increased public awareness of the project through teaching activities, such as the successful completion of two Master thesis and one Bachelor thesis.
QUB	Has published several scientific/research/journal and conference papers. It has presented work and results at international and regional conferences/meetings where delegates from the scientific community, developers, regulatory bodies and other relevant stakeholders have been present. QUB also has increased public awareness of the project and the Deep Green Technology through the Portaferry Marine Laboratory open weekend held once a year, reaching over 800 public members. It has also showcased results via the Tethys Marine Energy webinar reaching a wide community worldwide.
SSPA	Has presented the research of the project at the Advanced Model Measurement Technology for the Maritime Industry (AMT'17). It has submitted a conference paper for the International Conference on Computational Methods in Marine Engineering (MARINE) 2019. It has presented the project and project results through internal newsletter/magazine and website articles.
AC&E	Has presented the design analysis at simulation and modelling conferences such as NAFEMS UK Conference, at user events such as the SciTech Daresbury Open Day and with conference and scientific papers.
UWE	Has promoted the project at conference Offshore Technology Days 2018. It has also written article published in regional business newspaper to raise general awareness of the project.
MOOR	Has promoted the project results at key conferences on the subject of offshore technology (e.g. Offshore Technology Conference, Offshore Energy (OE) in Amsterdam and Offshore Northern Seas (ONS) in Stavanger). It has also presented the project in internal newsletter/magazine as well as contributing to other papers and presentations made by other consortium partners.

Table 2: Summary of individual dissemination activities.

### Academic dissemination

The dissemination of the project scientific results to the academic audience has been done by publications in international and national journals.

The partners have published articles in journals covering areas of expertise that are closely linked to ocean energy development (such as NAFEMS International Journal of CFD Case Studies) and environmental interactions (such as Journal of acoustical society of America Express Letters and PLoS ONE). Peer-reviewed articles have been deposited in European open access databases such as OpenAire ([www.openaire.eu](http://www.openaire.eu)) and national open access databases such as DIVA in Sweden. In total the project has published 5 journal papers documenting key project innovations.

An effective and natural way for academic dissemination is the use of project results in teaching and in the material of courses in universities. The project has generated course material regarding and provide subjects for thesis (Ph.D. and M.Sc.) at the universities involved (by the end of 2018 QUB had two Ph.D.'s related to the project's topics).

### Event dissemination

The project has been regularly disseminated at different conferences, tradeshows workshops and similar events.

MIN, ROC and LAB have focused on industry conferences focusing on ocean energy such as Ocean Energy Europe's annual conference, the All-Energy Conference and the International Conference on Ocean Energy (ICOE).

SSPA and AC&E have focused on industry conferences focusing on engineering analysis (hydro-/aerodynamic simulation, modelling and testing) such as International Conference on Computational Methods in Marine Engineering (MARINE), Advanced Model Measurement Technology for the Maritime Industry (AMT), International Association for the Engineering Modelling, Analysis and Simulation Community (NAFEMS).

CHA and QUB have focused on scientific conferences for both the electrical machines industry such as The International Conference on Electrical Machines, and conferences focusing on environmental interactions and LCA such as the 21<sup>st</sup> EEA (European Elasmobranch Association) Annual Scientific Conference. The consortium has presented at the European Geophysical Sciences Conference (where Dr Louise Kregting from QUB is the lead convenor for the Environmental Interactions of Renewable Energy Session).

In June 2017, the PowerKite project and the Deep Green technology were promoted at the Mission Innovation/Clean Energy Ministerial that took place in Beijing. In parallel with the Ministerial a Technology Exhibition was held. In a European Commission booth showcasing Horizon 2020 clean energy projects to ministers, clean energy business leaders, experts, policymakers, and other stakeholders, one of the key features was the PowerKite project and Deep Green.

Among other things, the stand was visited by US Secretary of Energy Rick Perry, Canada's Minister of Natural Resources James Gordon Carr, and Maroš Šefčovič, Vice-President of the European Commission in charge of Energy Union. Mission Innovation is a global initiative of 22 countries and the European Union to dramatically accelerate global clean energy innovation. It was the Second Mission Innovation Ministerial that was hosted at the China National Convention Center in Beijing.

### Dissemination through media publicity

The project has worked to generate news articles and reports in broad technical press such as Ny Teknik, Renewable Energy Magazine or Power Technology and general news media. Reports have been made as well in local Swedish newspaper Näringsliv as in the European Commission's Horizon Magazine.

The most noticeable dissemination activity through media publicity was the filming and broadcasting of a television documentary report on the PowerKite project by Euronews in May 2017. Euronews, a 24-hour information network, is the most-watched news channel in Europe.

The report was filmed at MIN's test facilities in Strangford Lough, Northern Ireland as part of a programme called Futuris on European science, research and innovation. It aired for a week's time on the Euronews cable network channel, broadcasted to 400 million households in 155 countries world-wide in EuroNews' thirteen broadcasting languages (English, German, Spanish, French, Italian, Portuguese, Russian, Arabic, Turkish, Persian, Ukrainian, Greek and Hungarian). Since May 2017 the report is also available to watch on demand at Euronews' website and YouTube channel.

Assuming that 0.5% of the households receiving Euronews watched the PowerKite report, and with a conservative assumption of an average two people per household, this means that the tv documentary reached some 4 million people worldwide. This is not taking account the reach through the on-demand video.

### Dissemination through newsletters / magazines / website / social media

A project website hosted at [www.powerkite-project.eu](http://www.powerkite-project.eu) has been developed where public reports, project deliverables, events and articles has been published in order to stimulate dissemination. All consortium partners have used their existing social media channels in order to disseminate information about the project progress to the scientific community and the end-users. Partner's internal and external newsletters/magazines have been used as platforms for disseminating the PowerKite project.

### Dissemination through project information and promotional material

ROC has produced information and promotional material that have been used during the project phase in order to generate interest from pilot partners and customers, for example project website content, project brochures, project scientific posters.

### Dissemination through collaboration activities

Some partners of the project are members in specific stakeholder associations such as Ocean Energy Europe, Renewable UK, Offshore Renewable Energy Catapult, UKCMER and have used those affiliations to disseminate the project results via newsletters, magazines and presence in international conferences not covered by the consortium partners.

Over the project phase the PowerKite consortium members have been involved in several national and international research and innovation activities that can provide mutual benefits to all parties in the networks (Table 3).

Project	Partners	Project description and cross-fertilization opportunities
MARINET 2 [FP7]	QUB MIN	A transnational EU-project which provides access to test facilities. QUB has facilities that are offered to developers through the MARINET 2 project, the knowledge built up from completing the trials has been valuable to the PowerKite project.
SWPTC [National Competence Center]	CHA	Swedish Wind Power Technology Centre is based on Chalmers University of Technology with the main focus on developing the wind turbine design to optimise costs for manufacturing and service. The knowledge about wind power which is built up in the centre has been applied on tidal energy in the PowerKite project (an example of knowledge transfer between industries).
TIDES [FP7]	CHA	A project demonstrating the energy conversion potential of a tidal array in a real sea environment off the coast of Northern Ireland. CHA has reused the power quality performance evaluation in the PowerKite business cases.
SEACAMS [ERDF]	MIN	A marine science programme for the benefit of Wales for new development to integrate research and business opportunities in the marine sector in Wales, in partnership with Bangor, Swansea and Aberystwyth Universities. SEACAMS included marine survey work, hydrodynamic resource modelling and environmental impact evaluations, the results of which has been used in PowerKite.
Tidal EC [FP7]	MIN	A collaborative research project focusing on generator design, modelling and optimization and generator temperature sensor system design and optimization for tidal energy converters. The results on reliability analysis and tether thermal modelling have been inputs to PowerKite.
DGO [UK DECC]	MIN	A project validating the survivability, prove performance and commercial viability of the 1:4 scale Deep Green prototype in Strangford Lough, Northern Ireland, of the innovative tidal energy power plant in real ocean conditions.
DG500 [ERDF and KIC InnoEnergy]	MIN	Project with the purpose to develop and deploy the first full-scale Deep Green power plant in Holyhead Deep, Wales. The project has been executed in parallel with the PowerKite project and results have been shared between the projects. More information in section 1.4.2 in the document Power Kite Annex 1 Part B 2015-11-19.

Table 3: Relevant research projects and cross-fertilization opportunities

Estimated impact of the dissemination activities

Dissemination type	Dissemination activities	Estimated number of people reached
Academic dissemination	Scientific/research/journal articles, theses	5,000
Event dissemination	Paper and posters	50,000
	Presentations at conferences and events	40,000
	Other participation in exhibitions, workshops etc.	5,000
Dissemination through media publicity	News articles and media reports	4,000,000 <sup>1</sup> (20,000 excl the Euronews report)
Dissemination through newsletters / magazines / website / social media	Newsletters and magazines	20,000
	Website and social media	20,000

Table 4: Estimated dissemination impact.

<sup>1</sup> Estimated reach linked to television documentary report broadcasted on Euronews in May 2017 (see also p.10). Euronews is broadcasted to 400 million households in 155 countries world-wide. Assuming that 0.5% of the households receiving Euronews watched the PowerKite report, and with a conservative assumption of an average two people per household, this means that the tv documentary reached some 4 million people worldwide. This is not taking account the reach through the on-demand video.

### Information on EU funding



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 654438.

### Disclaimer

The content of this report reflects only the author's view and the Agency is not responsible for any use that may be made of the information it contains.

## Annexes

Annex I: PowerKite Dissemination Log

## Annex I: Final Dissemination Log for the PowerKite project

Year	Date	Activity type	Title	Location	Main presenter	Project participation	Target audience	Main message/content	Reason	Estimated number of persons reached
2015	dec	Press release	Another EUR 5.1 million to Minesto's Deep Green technology	<a href="http://minesto.com/another-eur-5-1-million-to-minestos-deep-green-technology/">http://minesto.com/another-eur-5-1-million-to-minestos-deep-green-technology/</a>	MIN	All partner companies	All	Announcement of project	Raise awareness of the PowerKite project	10 000
2015	dec	Web publication		<a href="http://www.sspa.se/news/powerkite-%E2%80%93-power-take-system-subsea-tidal-kite">http://www.sspa.se/news/powerkite-%E2%80%93-power-take-system-subsea-tidal-kite</a>	SSPA	All partner companies	All	Announcement of project	Raise awareness of the PowerKite project	1 000
2016	mar	Web publication	http://www.sspa.se "Moon power" next step toward development of renewable energy	Internet	CHA	CHA	General public	General knowledge to promote tidal energy	Raise awareness of the PowerKite project	10 000
2016	mar	Seminar	Marine Energy Pembrokeshire 7th annual industry seminar	Milford Haven, UK	MIN	MIN	All	Minesto & Deep Green development in Wales	Raise awareness of the PowerKite project	300
2016	mar	Web news	News on Chalmers home page	Internet	CHA	CHA	General public	Powerkite technology for tidal power	Raise awareness of the PowerKite project	10 000
2016	mar	Web publication	Launch Powerkite external website	Internet	ROC	All partner companies	All	General presentation of project and partners	Raise awareness of the PowerKite project	1 000
2016	apr	Conference	OEE Strategy days	Brussels	LAB	LAB	Ocean energy stakeholders and EC representatives	General information on the Powerkite project and what it hopes to achieve	Raise awareness of the PowerKite project	200
2016	apr	Conference	Internal ENGIE Conference	Paris	LAB	LAB	R&D community of ENGIE (global coverage)	General information on the Powerkite project and what it hopes to achieve	Raise awareness of the PowerKite project	200
2016	maj	News letter/magazine	MoorNews	Printed and internet distribution	MOOR	LAB	All	General presentation of project	Raise awareness of the PowerKite project	500
2016	maj	News letter/magazine	RES - Internal ENGIE GROUP publication - aimed at I ENGIE BUs globally	Printed and internet distribution	LAB	LAB	All ENGIE BUs (globaly) focusing on renewable energy	General presentation of project and what it hopes to achieve	Raise awareness of the PowerKite project	10 000
2016	maj	Seminar	Bachelor thesis presentation - Power conversion (6 students)	Chalmers, Sweden	CHA	CHA	Academia and engineering students	Powerkite technology for tidal power	Raise interest among students and academia	100
2016	jun	Bachelor thesis	Bachelor thesis: (Title in swedish) Undersökning av det elektriska systemet för tidvattenkraftverket Deep Green i spänningsintervallet 500V till 3,3kV	Gothenburg	CHA	CHA, MIN, ROC	University students	Energy conversion technology for tidal power	General awareness	250
2016	jun	News letter/magazine	Highlights- exexternal publication aimed at ENGIE Lab Laborelec clients	Printed and internet distribution	LAB	LAB	All	General presentation of project, partner role in the project	Client contact	10 000
2016	jun	Newsletter/Magazine	SSPA Highlights 62 / 2016	Printed + Internet ( <a href="http://www.sspa.se/sites/www.sspa.se/files/field_page_files/2016_sspa_highlights_62.pdf">http://www.sspa.se/sites/www.sspa.se/files/field_page_files/2016_sspa_highlights_62.pdf</a> )	SSPA	LAB	All	General presentation of project and SSPA role in project	Raise awareness of the PowerKite project	1 000
2016	jun	Newspaper article in business paper "Näringsliv"	PowerKite project	SWE	UWE	LAB	All	Project visibility and UWE involvement	Raise awareness of the PowerKite project	10 000
2016	jul	Open Day	SciTech Daresbury Open Day	SciTech Daresbury	ac&e	LAB	General public	General information on the Powerkite project and what it hopes to achieve	Raise awareness of the PowerKite project	200
2016	aug	Master thesis	Master thesis - Improving Power Performance of Tethered Turbine Tidal Farms	Chalmers, Sweden	CHA	CHA, MIN, ROC	Academia and engineering students	Powerkite technology for tidal power	Raise interest among students and academia	200
2016	sep	Report	Environmental monitoring baseline report	Powerkite project public documet	QUB	QUB	All	General information on the approaches used for environmental monitoring	Deliverable	>500
2016	sep	Poster	Internal ENGIE Renewable Conference		LAB	LAB	R&D community of ENGIE (global coverage)	General information on the Powerkite project and what it hopes to achieve	Raise awareness of the PowerKite project	200
2016	okt	Conference	Ocean Energy Europé 2016	Brussels	MIN		Ocean energy community	General information on the Powerkite project and what it hopes to achieve	Raise awareness of the PowerKite project	150
2016	nov	Workshop	H2020 Ocean energy dissemination workshop	Bryssels	ROC		Tidal energy researchers	Cooperation on dissemination	Cooperation on dissemination	50

Year	Date	Activity type	Title	Location	Main presenter	Project participation	Target audience	Main message/content	Reason	Estimated number of persons reached
2016	nov	Presentation	Queen's University Belfast: The past and present research on environmental interactions of wave and tidal devices	Edinburgh	QUB	LAB	All	Discussed the work carried out by QUB	Disseminate the research of the Powerkite project	200
2017	jan	News article	Tidal energy poised to turn commercial	Horizon - the EU Research and Innovation Magazine	N/A		All	Potential of tidal energy and the Deep Green technology.	Raise awareness of the PowerKite project	1 000
2017	mar	Invited Talk	Queen's University Belfast: The past and present research with a focus on environmental of marine renewables	Launceston, Australia	QUB	QUB	Academia and engineering students	Overview of the environmental work carried out to date including the Powerkite Project and where we are at	Raise awareness of the PowerKite project	50
2017	apr	Exhibition - rolling presentation	Engineering Simulation Show	Derby, UK	ac&e	ac&e	Scientific/Engineering analysis community	Modelling & simulation has been used successfully in the design of PowerKite, an innovative tidal flow renewable energy device	Disseminate the research of the Powerkite project	100
2017	apr	Poster	A numerical 4D Collision Risk Model	Vienna, Austria	QUB	QUB	Academia and Industry	Development of a collision risk model to assess the probability of collision	Disseminate the research of the Powerkite project	11 000
2017	maj	Exhibition	Offshore Technology Conference 2017	Houston, USA	MOOR		Industry	General awareness of the PowerKite project and the objective of its research	Raise awareness of the PowerKite project	500
2017	maj	Brochure	Project presentation brochure	N/A	N/A		All	Presenting the project, its purpose and objectives	Raise awareness of the PowerKite project	500
2017	maj	Conference	All-Energy 2017: Cost-efficiency potential of operating in low-flow current environments	Glasgow, UK	MIN		Industry	How PTO development such as the PowerKite project research can contribute to cost reduction of tidal kite technology	Raise awareness of the PowerKite project	100
2017	maj	Workshop (Poster)	Elkraft 2017: Novel Electric Drive Solution for Tidal Power	Chalmers, Sweden	CHA	CHA	Academia, industry and engineering students	Reporting innovative research results on power conversion systems	Disseminate the research of the Powerkite project	2 000
2017	maj	Media report	Euronews television documentary report	N/A	N/A		All	General awareness of the PowerKite project and the objective of its research	Raise awareness of the PowerKite project	4 000 000
2017	maj	Poster	Integrating empirical data with probability distributions from a numerical 4-D model to assess marine mammal collision risk with a novel marine renewable energy device	Copenhagen, Denmark	QUB	QUB	Academia	Integrating biological parameters into the collision risk model	Disseminate the research of the Powerkite project	500
2017	maj	Talk	Assessing the effectiveness of multibeam sonar to assess marine life interactions with a subsea kite in a tidal channel	Copenhagen, Denmark	QUB	QUB	Academia	The effectiveness of multibeam sonars in a tidal environment	Disseminate the research of the Powerkite project	500
2017	jun	Conference	Mission Innovation/Clean Energy Ministeria	Beijing, China	N/A	All		Showcasing of PowerKite project and other H2020 clean energy projects to high-level industry stakeholders, policy stakeholders and researchers	Raise awareness of the PowerKite project	>300
2017	jul	Open day	Queen's Marine Laboratory Open Day	Portaferry, Northern Ireland	QUB	MIN	Public	Awareness of research projects	Raise awareness of the PowerKite project	500
2017	aug	Talk	Research on wave and tidal devices with a focus on environmental interactions	Burrrens, Ireland	QUB	QUB	Industry and engineering students	Overview of the environmental work carried out to date including the Powerkite Project and where we are at	Disseminate the research of the Powerkite project	100
2017	aug	Paper	Assessing marine life Interactions with a Subsea Kite in a Tidal Channel using Active Acoustics	Portaferry, Northern Ireland	QUB	QUB, Minesto	Academia, industry and engineering students	The effectiveness of multibeam sonars in a tidal environment	Disseminate the research of the Powerkite project	100
2017	aug	Talk	Optimising multiple multibeam sonars to assess marine life interactions with an underwater kite	Cork, Ireland	QUB	QUB	Academia, industry and engineering students	The effectiveness of multibeam sonars in a tidal environment	Disseminate the research of the Powerkite project	100
2017	sep	Conference/Paper	European Conference on Power Electronics and Applications 2017: Combined Voltage Balancing Techniques of the DC Link in Five-Level Medium Voltage NPC Back-to-Back Converters for Offshore Renewable Generation	Warsaw, Poland	CHA	CHA	Academia, industry and engineering students	Reporting innovative research results on power conversion systems	Disseminate the research of the Powerkite project	10 000
2017	okt	Conference	Advanced Model Measurement Technology for the Maritime Industry (AMT'17)	Glasgow, UK	SSPA	SSPA, MIN	Scientific, industry and engineering community	Reporting results on turbine development and testing	Disseminate the research of the Powerkite project	200
2017	okt	Conference	Assessing Marine Life Interactions with a Subsea Kite in a Tidal Channel using Active Acoustics	Amsterdam, Netherlands	QUB	QUB	Academia	Quantify the bio-physical drivers of top predator site usage	Disseminate the research of the Powerkite project	100

Year	Date	Activity type	Title	Location	Main presenter	Project participation	Target audience	Main message/content	Reason	Estimated number of persons reached
2017	nov	Presentation	Turbine Performance: comparison between CFD and measurements	Gothenburg, Sweden	MIN	MIN	Academia	Turbine Performance: comparison between CFD and measurements	Disseminate the research of the Powerkite project	50
2017	nov	Research Article	A Tool for Simulating Collision Probabilities of Animals with Marine Renewable Energy Devices	Plos One	QUB	CHA	Academia, industry, regulators	Development of a collision risk model to assess the probability of collision	Disseminate the research of the Powerkite project	>2000
2018	jan	Exhibition	STORM Moorings Masterclass Seminar	London, UK	MOOR		Industry	General information on the Powerkite project and what it hopes to achieve	Raise awareness of the Powerkite project	50
2018	feb	Conference/Poster	Advancing hydroacoustic monitoring in highly energetic environments: Novel insight into multi-scale, top predator dynamics in a tidal channel	Portland, Oregon	QUB	QUB, MIN, Kongsberg	Academia	Development of the Sonar system	Disseminate the research of the Powerkite project	>500
2018	apr	Conference	Elkraftdagen 2018: <a href="https://www.chalmers.se/en/conference/elkraftdagen/Pages/default.aspx">https://www.chalmers.se/en/conference/elkraftdagen/Pages/default.aspx</a>	Gothenburg, Sweden	CHA	CHA	Academia, industry and engineering students	Demonstration of the laboratory activities of the Powerkite project at Chalmers	Raise interest among students, industry and academia	200
2018	apr	Poster	Blender: utilising a game engine to investigate environmental interactions of marine renewables	Orkney, UK	QUB	QUB	Academia, industry, regulators	Development of the collision risk model	Disseminate the research of the Powerkite project	250
2018	apr	Presentation	Advancing multi-scale hydroacoustic monitoring in highly energetic environments: From fine scale target tracking to top predator occupancy patterns in a tidal channel	Orkney, UK	QUB	QUB, MIN	Academia, industry, regulators	Optimising data collection in tidal environments	Disseminate the research of the Powerkite project	250
2018	apr	Presentation	Integrating empirical data with probability distributions from a numerical 4-D model to assess marine mammal collision risk with marine renewable energy devices	Orkney, UK	QUB	QUB, CHA	Academia, industry, regulators	Development of the collision risk model	Disseminate the research of the Powerkite project	250
2018	maj	Exhibition	Offshore Technology Conference 2017	Houston, USA	MOOR		Industry	General awareness of the Powerkite project and the objective of its research	Raise awareness of the Powerkite project	500
2018	jun	Paper	International Conference on Ocean Energy 2018	Normandy	ROC/LAB	ROC, MIN, LAB, MOOR	Ocean energy community, Scientific, industry and engineering community	Concept array design	Disseminate the research of the Powerkite project	>500
2018	jun	Presentation	International Conference on Ocean Energy 2018	Normandy	ROC/LAB	ROC, MIN, LAB, MOOR	Ocean energy community, Scientific, industry and engineering community	Concept array design	Disseminate the research of the Powerkite project	50
2018	jun	Conference paper	Forces on submerged sub sea tidal kite in surface proximity	7th European Conference on Computational Fluid Dynamics, UK	QUB	QUB	Engineering community	To investigate the combined effect of waves and currents to inform on the most suitable met-ocean conditions for kite retrieval	Disseminate the research of the Powerkite project	>500
2018	jun	Presentation	Powerkite a Novel Tidal Energy Device Multi-Disciplinary Design Studies and Optimisation	The Manufacturing Centre, Coventry UK	AC&E	AC&E, MIN, SSPA, CHA	Engineering community	Collaborative multi-disciplinary design and optimisation	Disseminate the research of the Powerkite project	20
2018	jun	Open day	Queen's Marine Laboratory Open Day	Portaferry, Northern Ireland	QUB	MIN	Public	Awareness of research projects	Raise awareness of the Powerkite project	500
2018	jul	Scientific paper	FLUID-STRUCTURE INTERACTION OF A RIGID WING FOR MINESTO DEEP GREEN, A TIDAL ENERGY DEVICE	NAFEMS International Journal of CFD Case Studies	ac&e	ac&e	Scientific communities	Inform industry on Powerkite and how analysis methods have been used successfully in its design and operation	Disseminate the research of the Powerkite project	>2500
2018	jul	Final report	Life Cycle Assessment Report	Powerkite website	CHA	All	Ocean energy community, Scientific, industry and engineering community	Environmental performance of a tidal kite	Disseminate the research of the Powerkite project	200
2018	jul	Research Article	Fine-scale hydrodynamic metrics underlying predator occupancy patterns in tidal stream environments	Ecological Indicators	QUB	QUB	All	Whilst carrying out adcp surveys of a site, can also note animals in the vicinity to understand their use in the same area	Disseminate the research of the Powerkite project	>500
2018	jul	Conference/Paper	Fluid-Structure Interaction of a rigid wing for Powerkite, a tidal energy device	NAFEMS UK Conference, Milton Keynes	AC&E	AC&E, MIN	Engineering community	Presenting novel methods for fluid-structure interaction analysis	Disseminate the research of the Powerkite project	>500
2018	jul	Conference/Paper	Powerkite – optimisation of the power take-off system for a novel tidal energy device	NAFEMS UK Conference, Milton Keynes	AC&E	AC&E, MIN, SSPA, CHA	Engineering community	Collaborative multi-disciplinary design and optimisation	Disseminate the research of the Powerkite project	>500

Year	Date	Activity type	Title	Location	Main presenter	Project participation	Target audience	Main message/content	Reason	Estimated number of persons reached
2018	sep	Conference/Paper	ICEM 2018: Comparative Study of the Torque Ripple and Iron Losses of a Permanent Magnet Synchronous Generator Driven by Multilevel Converters	Alexandroupolis, Greece	CHA	CHA	Academia, industry and engineering students	Reporting innovative research results on power conversion systems	Disseminate the research of the Powerkite project	5 000
2018	sep	Conference/Paper	ICEM 2018: Generator Speed Control and Experimental Verification of Tidal Undersea Kite Systems	Alexandroupolis, Greece	CHA	CHA	Academia, industry and engineering students	Reporting innovative research results on power conversion systems		5 000
2018	sep	Conference/Paper	ECCE 2018: Feed-forward Control for Active Voltage Balancing in Electric Drives with Five-Level NPC Converters	Portland, USA	CHA	CHA	Academia, industry and engineering students	Reporting innovative research results on power conversion systems	Disseminate the research of the Powerkite project	10 000
2018	sep	Conference/Paper	ECCE 2018: DC Link Voltage Balancing Technique Utilizing Space Vector Control in SIC-based Five-Level Back-to-Back-Connected NPC Converters	Portland, USA	CHA	CHA	Academia, industry and engineering students	Reporting innovative research results on power conversion systems	Disseminate the research of the Powerkite project	10 000
2018	okt	Exhibition	Offshore Technology Days 2018	Bergen, Norway	UWE	UWE	All	Display of parts	Raise interest in Offshore & Subsea business	2 000
2018	nov	Presentation/poster	presenting the Powerkite project and DeepGreen technology to 350 members of the ENGIE Group at the internal RES Seminar	RES Seminar ENGIE	LBE		Industry, business developers	Project presentation	Raise awareness and interest in the private industry	50
2018	nov	Scientific paper	Noise characterisation of a sub-sea tidal kite	Journal of acoustical society of America Express Letters	QUB	QUB	All	Characterisation of the noise of the tether and wing of the kite	Disseminate the research of the Powerkite project	>500
2018	nov	Presentation	Gothenburg Region OpenFOAM User Group Meeting	Gothenburg, Sweden	MIN		Academia, engineering community	Turbine performance: comparison between CFD and measurements	Disseminate the research of the Powerkite project	50
2018	nov	Master thesis	Master thesis - Overvoltage mitigation of PWM controlled PMSG through long cables for a subsea power plant	Chalmers, Sweden	CHA	CHA, MIN, ROC	Academia and engineering students	Powerkite technology for tidal power	Raise interest among students and academia	200
2018	dec	Final Report	Final Report of Environmental Impact	PowerKite website	QUB	MIN	All	How low an impact the kite in Strangford is to the marine environment	Disseminate the research of the Powerkite project	200
2018	dec	Conference/Paper (submitted - still under review)	European Conference on Power Electronics and Applications 2019: Overvoltage Mitigation of Medium Voltage Electric Drives with Long Cables using Multilevel-Converters and Passive Filters	Genova, Italy	CHA	CHA, MIN	Academia, industry and engineering students	Reporting innovative research results on transient overvoltages in power conversion systems	Disseminate the research of the Powerkite project	10 000
Continuously		News items	Project news	PowerKite website	ROC		General public	Progress and achievements in the Powerkite project	Raise awareness of the PowerKite project	1 000
<u>Planned dissemination activities after project end</u>										
2019	jan	Scientific paper	Providing ecological context to anthropogenic subsea noise: assessing listening space reductions of marine mammals from tidal energy devices	Sustainable Energy Reviews	QUB	QUB	Scientific communities/Public authorities	How far away is the noise field a problem for animals	Disseminate the research of the Powerkite project	
2019	feb	Scientific paper	Journal paper based on the: Generator Speed Control and Experimental Verification of Tidal Undersea Kite Systems	IEEE Transactions on Industry Applications	CHA	CHA	Academia, industry and engineering students	Presenting an experimental way of emulating tidal power generation in laboratory conditions (extension of previous paper at ICEM2018)	Disseminate the research of the Powerkite project	5 000
2019	March/ April	Licentiate thesis	Medium voltage power conversion systems used in offshore tidal power applications	Licentiate thesis	CHA	CHA, MIN, ROC	Academia, industry and engineering students	Licentiate degree: presented and obtained at the half time before completion of PhD degree	Disseminate the research of the Powerkite project	5 000
2019	March/ April	Scientific paper	The detrimental environmental impact of sub-sea renewables is an unwarranted fear.	Journal paper	QUB	QUB	All	No impact on the substrate could be found	Disseminate the research of the Powerkite project	
2019	March/ April	Scientific paper	Angles, speed and size: Applying ecological parameters to collision risk simulations	Journal paper	QUB	CHA	All	Demonstrate how adding ecological indicators can significantly reduce the risk of collision	Disseminate the research of the Powerkite project	

Year	Date	Activity type	Title	Location	Main presenter	Project participation	Target audience	Main message/content	Reason	Estimated number of persons reached
2019	maj	Conference paper	Design of Low Drag-to-Power Ratio Hydrokinetic Turbine	Marine 2019 - VII International Conference on Computational Methods in Marine Engineering, Gothenburg, Sweden	SSPA	MIN	Scientific and engineering community	Numerical modelling has been used to improve the efficiency of a hydrokinetic turbine; This has been verified in model-scale tests.	Disseminate the research of the Powerkite project	200