



HydroFlex: Mid-term review and publication of non-confidential results



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 764011.

HydroFlex

Increasing the value of hydropower through increased flexibility

Deliverable 6.26 Mid-term review and publication of non-confidential results (with a focus on fundamental science/results), including publication with target journals, press releases and articles

Work package	WP6 Communication, dissemination and exploitation
Task	Task 6.4 Publications and presentations
Lead beneficiary	Multiconsult
Authors	Sara Heidenreich, Bjarne Børresen
Due date of deliverable	2020-04-30
Actual Submission date	2020-04-30
Type of deliverable	Report
Dissemination level	Public

Executive Summary

This deliverable reviews the HydroFlex results published during the first 2 years of the project. Based on the key performance indicators defined in the project proposal, it evaluates the status of each dissemination and communication category and provides suggestions for improvements.

In sum, the current status of results and publications is satisfactory. Identified points of improvement are:

- Increase number of high impact journal publications as compared to conference proceedings
- Produce more popular scientific media articles
- Focus on dissemination to non-expert target groups and general public
- Increase the presentation of HydroFlex results in university lectures
- Add a presentation of HydroFlex to all partner websites



Table of Contents

Executive Summary	2
Table of Contents	3
Introduction	4
HydroFlex Key Performance Indicators	4
Current status	5
Evaluation of status.....	9
Conclusion and points of improvement.....	10

Introduction

Current power system planning is based on existing dynamic performance of power plants. In order to include the progress achieved in HydroFlex, the transmission system operators (TSOs) and other organizations and stakeholders involved in power system development must be aware of the new potential in flexible hydropower. Hence, effective dissemination of project results is essential.

The dissemination activities in HydroFlex focus on bringing high value scientific and technical results from the research out to the hydropower industry stakeholders. The overarching goal is to ensure that the new understanding of the technical, environmental and economic potential of flexible hydropower is included in planning and execution of future refurbishment, upgrading, modernization of existing hydropower plants and in new installations.

Dissemination to other target groups, such as the scientific community, policy makers, NGOs and the general public is just as important to ensure that technical, economic, environmental and social aspects of flexible hydropower are taken into consideration in policy making and planning.

In this deliverable, we review the publicly available project results and their publication in the first 2 years of the HydroFlex project. We do this by evaluating the current status as compared to the key performance indicators defined in the project proposal. Obviously, the availability of project results and the numbers of publications will accelerate during the second half of the project period.

HydroFlex Key Performance Indicators

The HydroFlex project has identified the following key performance indicators related to the dissemination of project results (further indicators address project execution, exploitation and innovation, and partners relations).

Table 1 HydroFlex Key Performance Indicators (Grant Agreement Annex 1, Part B, pg 32)

Key Performance Indicator	Target value
Dissemination:	<ul style="list-style-type: none"> ➤ Secure a high scientific standard within HydroFlex ➤ Secure relevance and close collaboration with industry ➤ Secure good processes that bridge innovation and implementation between research and industry ➤ Ensure a visible and good position in public media and towards stakeholders
>12 conference contributions	
>32 peer-reviewed papers	
>30 popular media articles	
1 annual industry convention with industry partners	
1 annual meeting with the Dissemination and Exploitation Advisory Committee	
Annual workshops targeting possible users, policy makers and R&D community	
Communication:	

100 views on HydroFlex's website per month	➤ HydroFlex promotes the project idea and its results to the target audiences
10 media articles, interviews and popular scientific presentation	
10 presentations of HydroFlex results in University lectures	
HydroFlex movie	
HydroFlex presentation on the partners' websites	
7 publicly available newsletters	

Current status

Key Performance Indicator	Status 31.03.2020
Dissemination:	
>12 conference contributions	<p>8 conference contributions</p> <p><u>Burman, A, Andersson, A & Hellström, G (2019): Inherent damping in a partially dry river. In: <i>Proceedings of the 38th IAHR World Congress</i> [ed] Lucas Calvo, p. 5091-5100.</u></p> <p><u>Felicetti, R, Abrahamsson, C & Urban, L (2019): Experimentally validated model of a fast switched salient pole rotor winding. In: <i>2019 IEEE Workshop on Electrical Machines Design, Control and Diagnosis (WEMDCD)</i>, IEEE, 2019, p. 150-156.</u></p> <p><u>Foti, P & Berto, F. (2019): Francis-99: Evaluation of the strain energy density value for welded joints typical of turbine runner blades. <i>Journal of Physics: Conference Series</i> 1296 012007.</u></p> <p>Juarez (2019) Assessing the impact of Hydropeaking utilizing a 2D hydraulic model. Vienna.</p> <p>Joy, J., Dekhordi, M.R. & Cervantes, M. J. (2019): <i>Numerical Study on Reduced Francis-99 Turbine Model during Part Load Operation</i>. Forthcoming in: Conference Proceedings of 15th Asian International Conference on Fluid Machinery, Busan, South Kora.</p> <p><u>Lazarevikj, M, Stojkovski, F, Iliev, I & Markov, Z (2019): Influence of the guide vanes design on stress parameters of Francis-99 turbine. <i>Journal of Physics: Conference Series</i> 1296 01200</u></p> <p><u>Markov, Z, Stojkovski, F, Lazarevikj, M & Iliev, I (2018): Investigation of the possibilities for development of a variable speed hydraulic</u></p>

	<p><u>turbine. Energetics 2018 Conference Proceedings Book, pp. 333-341.</u></p> <p>Tang, C. & Thiringer, T. (2019): <i>Thermal simulation of a multichip inverter</i>. EPE 2019. Genoa. (Forthcoming in Conference Proceedings of EPE 2019)</p>
<p>>32 peer-reviewed papers</p>	<p>9 peer-reviewed papers</p> <p><u>Burman, A, Andersson, A & Hellström, G (2019): Inherent damping in a partially dry river. In: <i>Proceedings of the 38th IAHR World Congress</i> [ed] Lucas Calvo, p. 5091-5100.</u></p> <p><u>Felicetti, R, Abrahamsson, C & Urban, L (2019): Experimentally validated model of a fast switched salient pole rotor winding. In: <i>2019 IEEE Workshop on Electrical Machines Design, Control and Diagnosis (WEMDCD)</i>, IEEE, 2019, p. 150-156.</u></p> <p><u>Foti, P & Berto, F. (2019): Francis-99: Evaluation of the strain energy density value for welded joints typical of turbine runner blades. <i>Journal of Physics: Conference Series</i> 1296 012007.</u></p> <p>Joy, J., Dekhordi, M.R. & Cervantes, M. J. (2019): <i>Numerical Study on Reduced Francis-99 Turbine Model during Part Load Operation</i>. Forthcoming in: Conference Proceedings of 15th Asian International Conference on Fluid Machinery, Busan, South Korea.</p> <p><u>Lazarevikj, M, Stojkovski, F, Iliev, I & Markov, Z (2019): Influence of the guide vanes design on stress parameters of Francis-99 turbine. <i>Journal of Physics: Conference Series</i> 1296 01200</u></p> <p><u>Markov, Z, Stojkovski, F, Lazarevikj, M & Iliev, I (2018): Investigation of the possibilities for development of a variable speed hydraulic turbine. <i>Energetics 2018 Conference Proceedings Book</i>, pp. 333-341.</u></p> <p><u>Storli, P. & Lundström, S (2019): A new Technical Concept for Water Management and Possible Uses in Future Water Systems. <i>Water</i> 11, 2528; doi:10.3390/w11122528.</u></p> <p>Tang, C. & Thiringer, T. (2019): <i>Thermal simulation of a multichip inverter</i>. EPE 2019. Genoa. (Forthcoming in Conference Proceedings of EPE 2019)</p>

	<p><u>Trivedi, C. & Dahlhaug O. G. (2019): A Comprehensive Review of Verification and Validation Techniques Applied to Hydraulic Turbines. International Journal of Fluid Machinery and Systems 12(4), pp. 345-367.</u></p>
>30 popular media articles	<p>4 popular media articles</p> <p>https://www.h2020hydroflex.eu/scenarios-of-the-future/</p> <p>https://www.ansys.com/blog/future-of-hydropower-water-turbine-design-for-peak-energy-demands</p> <p>https://www.h2020hydroflex.eu/summary-popular-science-presentations/</p> <p>https://www.energinorge.no/fagomrader/energibruk-og-klima/nyheter/2018/-vannkraften-for-viktig-til-a-bli-glemt-av-brussel/</p>
1 annual industry convention with industry partners	<p>Francis-99 workshop (May 2019)</p> <p>Common workshop with Swedish Hydropower Centre (postponed to autumn 2020)</p>
1 annual meeting with the Dissemination and Exploitation Advisory Committee	<p>The Dissemination and Exploitation Advisory Committee joins the HydroFlex workshops and technical progress meetings.</p>
Annual workshops targeting possible users, policy makers and R&D community	<p>4 webinars: https://www.h2020hydroflex.eu/publications/webinars/</p> <p>1 public workshop (Francis-99)</p>
Communication:	
100 views on HydroFlex's website per month	<p>Average 188 sessions/month (google analytics)</p>
10 media articles, interviews and popular scientific presentation	<p>Poster exhibition: https://www.h2020hydroflex.eu/hydroflex-poster-exhibition/#</p> <p>Presentation at EnergiNorge seminar “<u>Post COP-24- How to unlock clean and flexible hydropower in Europe</u>” in Brussels on December 18: https://www.h2020hydroflex.eu/new-hydroflex-publication/</p> <p>4 popular scientific presentation at HydroFlex workshop 1: https://www.h2020hydroflex.eu/summary-popular-science-presentations/</p> <p>Stand at Big Challenge Science Festival in Trondheim June 2019</p>

	Presentation at PTK 2020 conference in Trondheim
10 presentations of HydroFlex results in University lectures	<p>NTNU: Lecture on data collection and GIS use in hydrological modelling in TVM4106 Hydrological Modelling. Hydroflex results to illustrate measurements and modelling</p> <p>UU: Lecture on the use of powerelectronics in hydropower generators for 4th year students</p> <p>EDR: CFD analysis of turbine. On-going work is used to show recent research and progress in hydro turbines to the post-graduate students - Teaching.</p>
HydroFlex movie	under development, available on 30.06.2020
HydroFlex presentation on the partners' websites	<p>NTNU: https://www.ntnu.edu/ept/process-power#/view/about</p> <p>LTU: https://www.ltu.se/research/subjects/Stromningslara/Nyheter-och-aktuellt/Europeiskt-projekt-ska-ge-flexibla-re-vattenkraft-1.171601?l=en</p> <p>UU:</p> <p>Chalmers: https://www.chalmers.se/en/projects/Pages/Increasing-the-value-of-Hydropower-through-increased-Flexibility.aspx</p> <p>SINTEF: https://www.sintef.no/en/projects/hydroflex/</p> <p>Lyse:</p> <p>Rainpower: https://www.rainpower.eu/research-development/Vattenfall</p> <p>Statkraft: https://www.statkraft.com/what-we-do/innovation/what-were-working-on/</p> <p>NINA:</p> <p>USTRAT: https://pureportal.strath.ac.uk/en/projects/increasing-the-value-of-hydropower-through-increased-flexibility-h</p> <p>UKIM: https://www.mf.ukim.edu.mk/mk/hydroflex</p> <p>ABB:</p> <p>RWTH: https://www.iaew.rwth-aachen.de/cms/IAEW/Forschung/~dqsvg/Oeffentliche-Forschungsprojekte/lidx/1/</p> <p>Multiconsult:</p> <p>EDR: https://digitallabs.edrmedeso.com/hydropower-research</p>
7 publicly available newsletters	3 newsletters are published: https://www.h2020hydroflex.eu/news/newsletter/

Evaluation of status

Conference contributions

Considering that only half of the project period is over, the number of conference contributions is very high compared to the defined KPI. HydroFlex partners should continue to actively disseminate their results at conferences.

Peer-reviewed publications

Considering that most results will be available during the second half of the project and that the process for publishing peer-reviewed papers takes time, the numbers of peer-reviewed publications is highly satisfactory. However, the majority of publications are conference proceedings. HydroFlex partners should also aim to increase the number of journal publications in high-impact journals.

Popular media articles

The number of popular media articles is low compared to the defined KPI. This can partly be explained by the fact the most results will be available during the second half of the project and dissemination will therefore accelerate in the next two year. However, HydroFlex partners should focus more on popular science publications so that the targeted number can be reached.

Annual workshops and meetings with DEAC, industry partners and other target groups

The first workshops took place as planned. Due to the restrictions related to the Corona virus, the workshop planned for April 2020 in Uppsala has been postponed.

Views on HydroFlex website

The website views are according to the defined target.

Media articles, interviews and popular scientific presentations

The status is according to the plan. However, HydroFlex partners should continue to focus on making their results accessible not only to other scientists and expert, but also to lay stakeholders and the general public.

Presentation of HydroFlex results in university lectures

The presentation of project results in university lectures should be intensified by the university partners.

HydroFlex movie

Under development

HydroFlex presentation on partners' websites

The partners who do not have HydroFlex presentations on their websites yet, will be requested to add one.

Newsletters

According to plan

Conclusion and points of improvement

Considering that most HydroFlex results will become available during the second half of the project, the current status of results and publications is satisfactory. However, there are several points of improvement which HydroFlex partners should focus on during the second half of the project:

- Increase number of high impact journal publications as compared to conference proceedings
- Produce more popular scientific media articles
- Focus on dissemination to non-expert target groups and general public
- Increase the presentation of HydroFlex results in university lectures
- Add a presentation of HydroFlex to all partner websites