Dear Anonymous Reviewer, thank you very much for your comments. In agreement with your comments, we will modify the manuscript, that, we hope, will become better and easier. We answer to your comments point to point.

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1)

My major comment to this paper is that the experiments are not explained in detail, so that the interpretation of the values of the numerical simulations is not traceable. It isimportant to give details about how and with which measurement devices torque, rpm,flow and hydraulic heads are measured and to now the uncertainties of these devices.

Thank you very much for your suggestions.

As now reported in chapter 2.2, we have performed detailed experimental tests, and we have deeply described the experimental results in Quaranta and Revelli (2015a) and Quaranta and Revelli (2016). In order to make the paper shorter and simpler, we have preferred to remind to these two publications, where all the instruments uncertainties have been described. In this paper we have added the torque uncertainty, which is the most important one to consider for the aim of the paper.

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2)

Are the measured values validated? It seems to me that the difference between the experimental and the numerical results might be within the uncertainties of the experimental setup and thus the impact of the different forms of the blades on the torque and with this on the efficiency and the power may not be really distinguishable. Please validate the measurement data and show the results in the paper.

Thank you. As discussed in Quaranta and Revelli (2016b), the results are validated on the experimental torque (also reported in Table 1) and water depths. We will add to the present manuscript the torque uncertainty, which is 6 Nm.

The torque difference generated by using different profiles might be within the uncertainties of the experimental setup. Anyway, being the numerical model the same for each configuration, the uncertainty of each result is reasonably the same. Therefore, it is possible to say that profile 2 is the best among the investigated profiles. The results on the torque may quantitatively differ from the real one (due to the approximation necessarily unavoidable by CFD simulations). However, being the discrepancy reasonably the same for each configuration, it is possible to say that the percentage torque differences among the different profiles well respect the real/exact ones. Thus profile 2 is the optimal profile among the investigated ones, and the efficiency of the wheel can be improved.

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3)

My other comments are: line 15 Why is hydropower considered as one of the mostimportant renewable energies?

Thank you. This because it is the most used renewable source in the world. We will add a reference, specifying this aspect better.

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4)

line 17
How long is a long payback time?

Thank you. Yes, we agree. We have written now that payback times of micro hydro are shorter than payback times of larger hydro schemes.

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5)

line 17
Incorporate the EU Water Framework Directive (2000); this is the official document on which the continuity of rivers and streams is specified.

Yes, thank you.

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6)

line 20
“: : :. are still notexploited : : :.” This needs to be considered more differentiated. There have beenthousands of small mills up to about 100 years ago and then got neglected as turbines(that could also transform higher flows into electricity) and generators were invented.So, many of the sites have been exploited but are nowadays neglected.

Thank you for your specification. We will specify better.

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7)

line 29 “: : :.
The upstream water level can be controlled: : :.”. why “can”? Are there other ways tocontrol the water level?

In water wheels the upstream water level can be controlled/imposed by means of sluice gates or inflow weirs. However, these inflow structures are not mandatory.

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8)

line 41

Why are water wheels environmental friendly? How doyou define this? Is this proven? If so, please quote.

They are environmental friendly because of the large cells and low rotational speed. We will quote what we say. Thank you.

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9)

line 93.

Why have you chosen exactly this curvature for the modified blade profiles? Is there any resemblance to other blade profiles e.g. Zuppinger Wheel blades?

Zuppinger water wheels are different from the investigated wheel. Zuppinger wheels do not have sluice gate upstream. The water level just upstream of the Zuppinger wheel is deeper. Zuppinger wheels do not exploit the kinetic energy; actually, they generate very high power losses when entering into the water (Quaranta and Muller, 2017). The investigated water wheel, instead, exploits the kinetic energy of the entering flow, although some power losses are obviously generated. This curvature was chosen because it well satisfies all the prescription described in section 1.1. As we say, the lower the curvature radius of the blades, the better the power output, since the higher the changing in momentum of the water flow, i.e. the generated force. However, there is a limit on the minimum radius. For example, in our case, and considering the configuration in the entry point, a curvature radius of 0.2 m (1/5 R, where R is the wheel radius) would have a portion of the profile that would be vertical. This would generate separation of flow and resistance; the flow would tend to fall down during the filling process, with additional power losses. Therefore, the chosen circular radius is the minimum optimal one.

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10)

line 129:

“: : :.an optimal radius can be considered: : :.” maybe was considered is more correct? Did you utilize r =0,25m? Or could it be another value?

Right. Thank you!

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11)

table 1

I am sorry, but I cannot reproduce some of the calculated values (namely -1,16%, 5,4% and 5,7%).

Yes, we agree, 1.11 instead of 1.16. The other values seem to be right to us (C1-Cexp)/Cexp.

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12)

Please consider: would itbe more feasible to compare in column 7 (Cexp-C1)/C1, so that all percentages areinvestigated from the same basis?

Thank you, good osservation. We did (C1-Cexp)/Cexp, because this is the validation, where we compare the numerical torque with the experimental one. Then, we calculate the numerical differences of the two additional profiles with respect to the first one. We will specify this in the text. Thank you

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13)

line 198/199 The values in the text are not identicalwith the values in table 1.

Thank you.