

## ***Interactive comment on “Effect of tidal stream power generation on the region-wide circulation in a shallow sea” by G. I. Shapiro***

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A revised paper with responses to the referees as indicated in the discussion should generally be acceptable. I would like to make a few additional points.

Linear (Rayleigh) friction. All the referees commented but the new text (5) to (11) generally deals with this well. In my opinion this new text could be reduced / “streamlined” a bit. However, there is an important statement after (10) “The generated electric power  $PE$  is equal to the reduction of mechanical power of the flow  $P$  less small energy losses . . .”. “Small” relates to the comment of Referee 2 about other losses of power. I don’t think that Figure 1(b) proves that the losses are small, although they might have the right dependence on flow speed. Any evidence about “small” energy losses would be useful here.

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Referees 1 and 3 comment about alternative shapes of farm. Definitely include the alternative linear farm as well, but I think this response is OK / sufficient.

Referee 2 comment “Even with the assumption of depth-uniform drag coefficient, the value of this needs to be related to the type and spacing of turbines . . .”. The response relates the range of power generation to La Rance. However, it is not obvious that the area of turbines is capable of generating as much as La Rance. It is very unlikely that the effect of the turbines will be to attract more energy flux to the turbine farm; hence there is an inherent limit related to the tidal energy flux intercepted by the farm; this implies a limit on the drag coefficient.

Referee 2 comment “Unless these problems are addressed . . .” This calls for an explicit emphatic statement in the paper that existing estimates related to tidal farms should not be taken too seriously.

Referee 2 comment re L41. I think this calls for a qualification in the text, next to “almost inexhaustible”, that extractable energy is limited.

Referee 2 comment re L54. Some change in the text is called for but I think this is all a minor quibble.

Referee 2 comment re L55. Perhaps the wording should be more cautious. “E.g. may be a potential stable source” rather than “deemed to become a stable source”. [Although the Severn is unlikely for a while, the project for the Mersey seems to have some momentum – public consultations are taking place].

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Interactive comment on Ocean Sci. Discuss., 7, 1785, 2010.