

# SMS-303: Integrative marine sciences III.

## Assignment #3

Homework:

Login to the Boston Globe to an article published two years ago:

[http://www.boston.com/news/local/massachusetts/articles/2005/10/23/mass\\_among\\_states\\_backing\\_tidal\\_power\\_study/](http://www.boston.com/news/local/massachusetts/articles/2005/10/23/mass_among_states_backing_tidal_power_study/)

This article discusses a study commissioned for the feasibility of using the tides of the Bay of Fundy to produce electricity.

1. What is the difference between the new method proposed to harness the tidal energy from that already in use for one power station in the Bay?
2. Which of the two approaches is most likely to change the geometry of the basin when done in large scale? How can changing the geometry of the basin affect its tides (think about what we discussed in the wave lecture)?
3. Given (from the 'wave' class) that the flux of energy due to a wave per unit length of beach is given by the product of the group velocity ( $c_g$ ) and the wave energy  $\{(\rho g a^2)/2\}$ , calculate the maximal amount of energy per tidal period for one meter of beach (for the group velocity assume the length of the basin to be 270km and that it takes about 12hrs to propagate the whole length of the basin). Use realistic amplitude based on what you found during today's class. How many 100W light bulbs can you light up per 1m of beach assuming you can convert all the tidal energy into electricity (conversion efficiency are usually only several percents)?

For an article regarding Maine and tidal energy proposals see for example MSNBC's: <http://www.msnbc.msn.com/id/13561656/>

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