Advanced Features Course

Online Training Materials

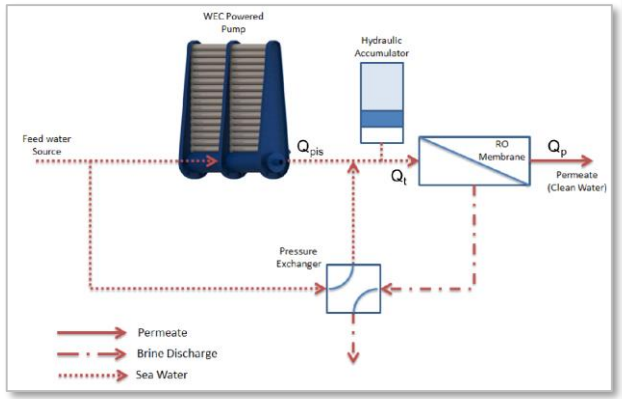
PRESENTED BY

Kelley Ruehl, Sandia

Desalination

WEC-Sim Training- Advanced Features

Wave-Powered Desalination System



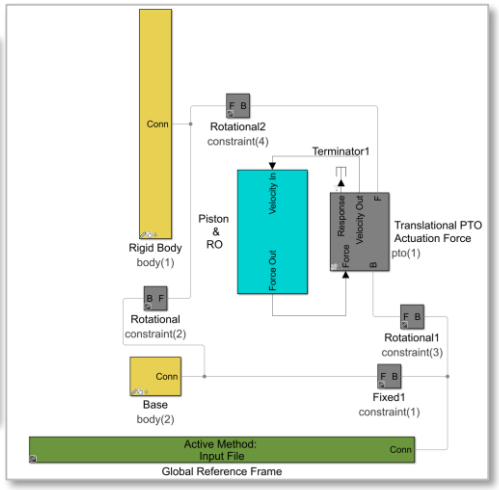
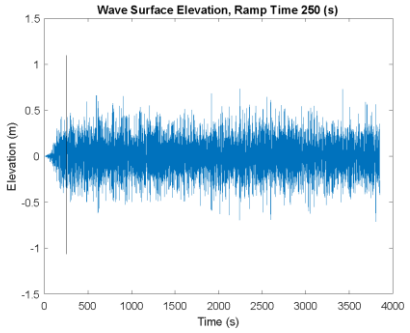


Figure 1 from Yu 2018 refer to J. Mar. Sci. Eng. **2018**, 6, 132

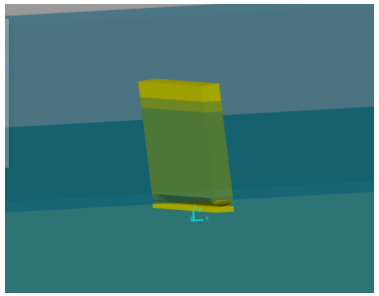
The reverse osmosis (RO) membrane can be modeled similar to power take-off (PTO) systems in WEC-Sim, by providing forces back to the WEC.

The model takes the wave resource as its input, and provides volumetric flow of permeate (desalinated water) as its output

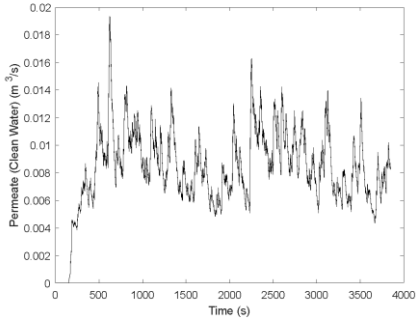
Wave Resource



WEC Farm



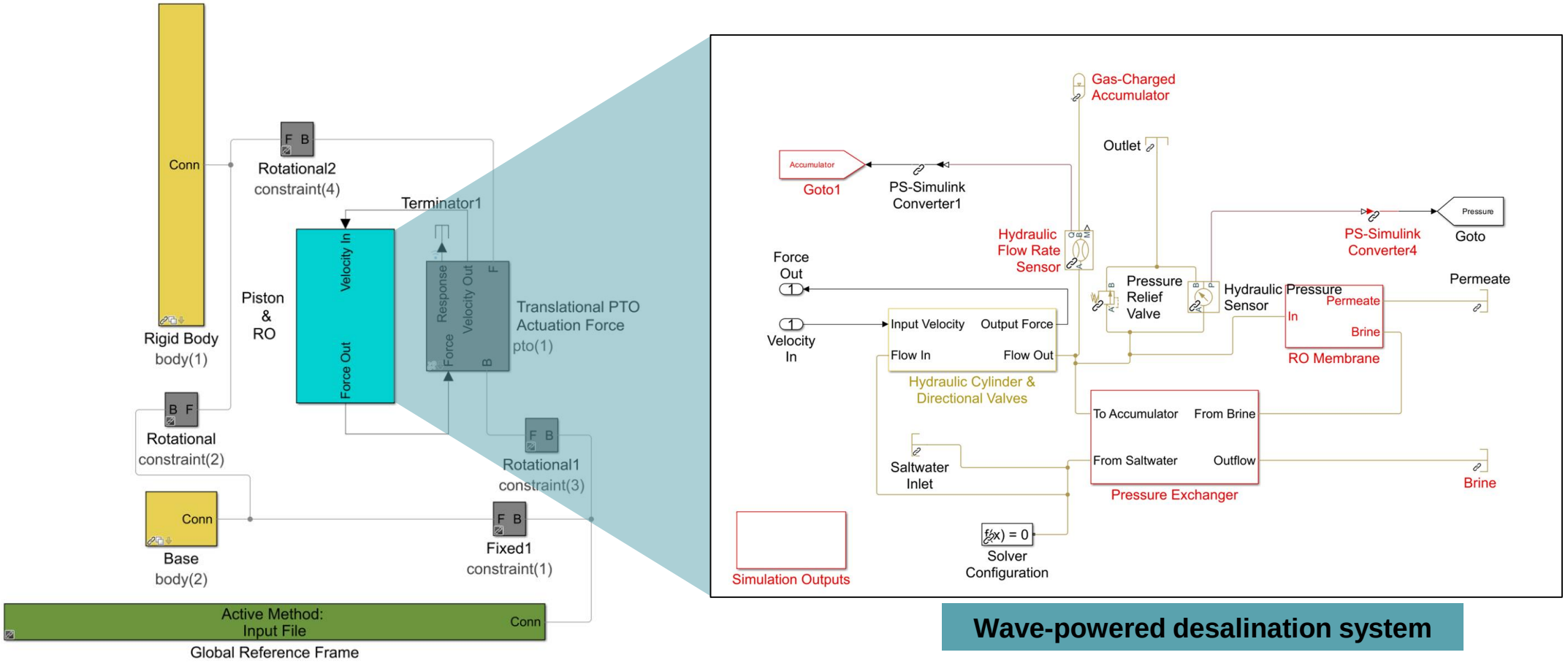
Permeate



Example using WEC-Sim to model a RO desalination plant available here: https://github.com/WEC-Sim/WEC-Sim_Applications/tree/master/Desalination

NOTE: Requires the MATLAB Toolbox **Simscape Fluids**

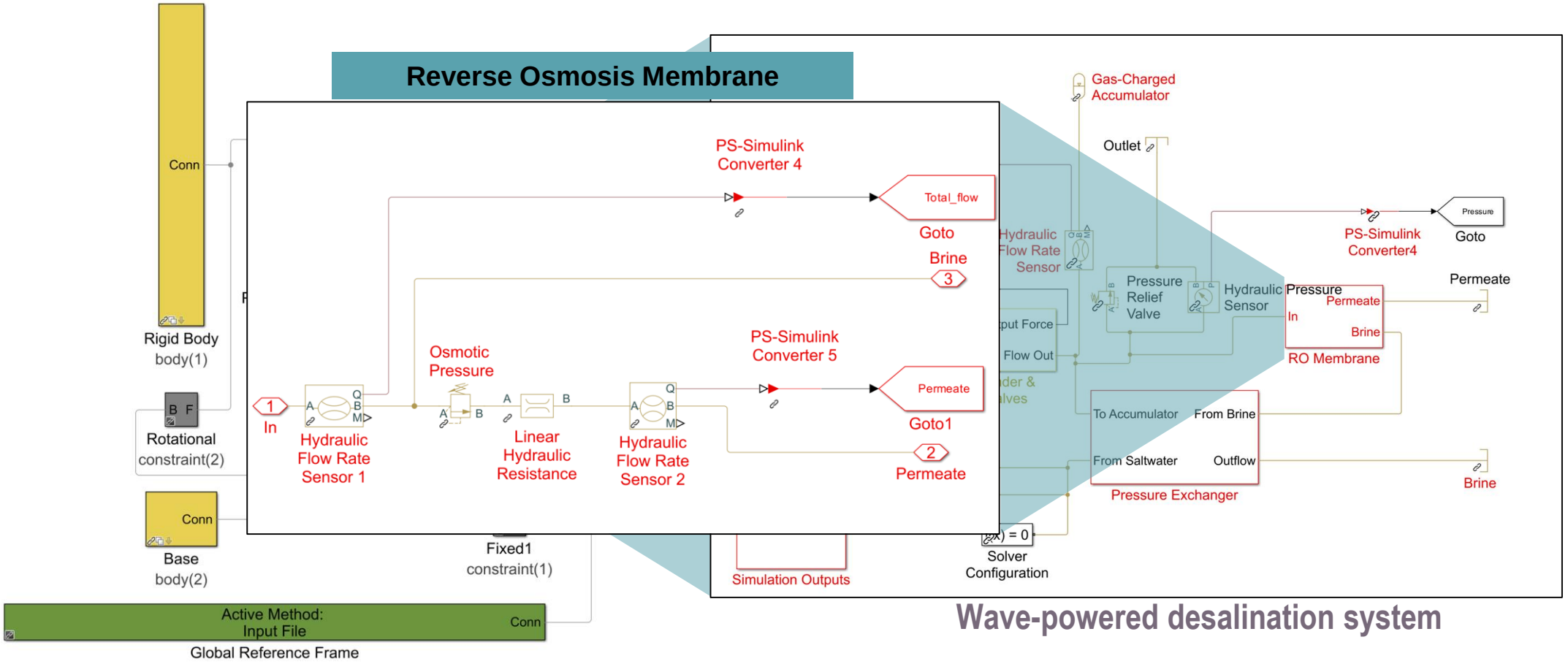
WEC-Sim Model



Wave-powered desalination system

https://github.com/WEC-Sim/WEC-Sim_Applications/tree/master/Desalination

WEC-Sim Model



Wave-powered desalination system

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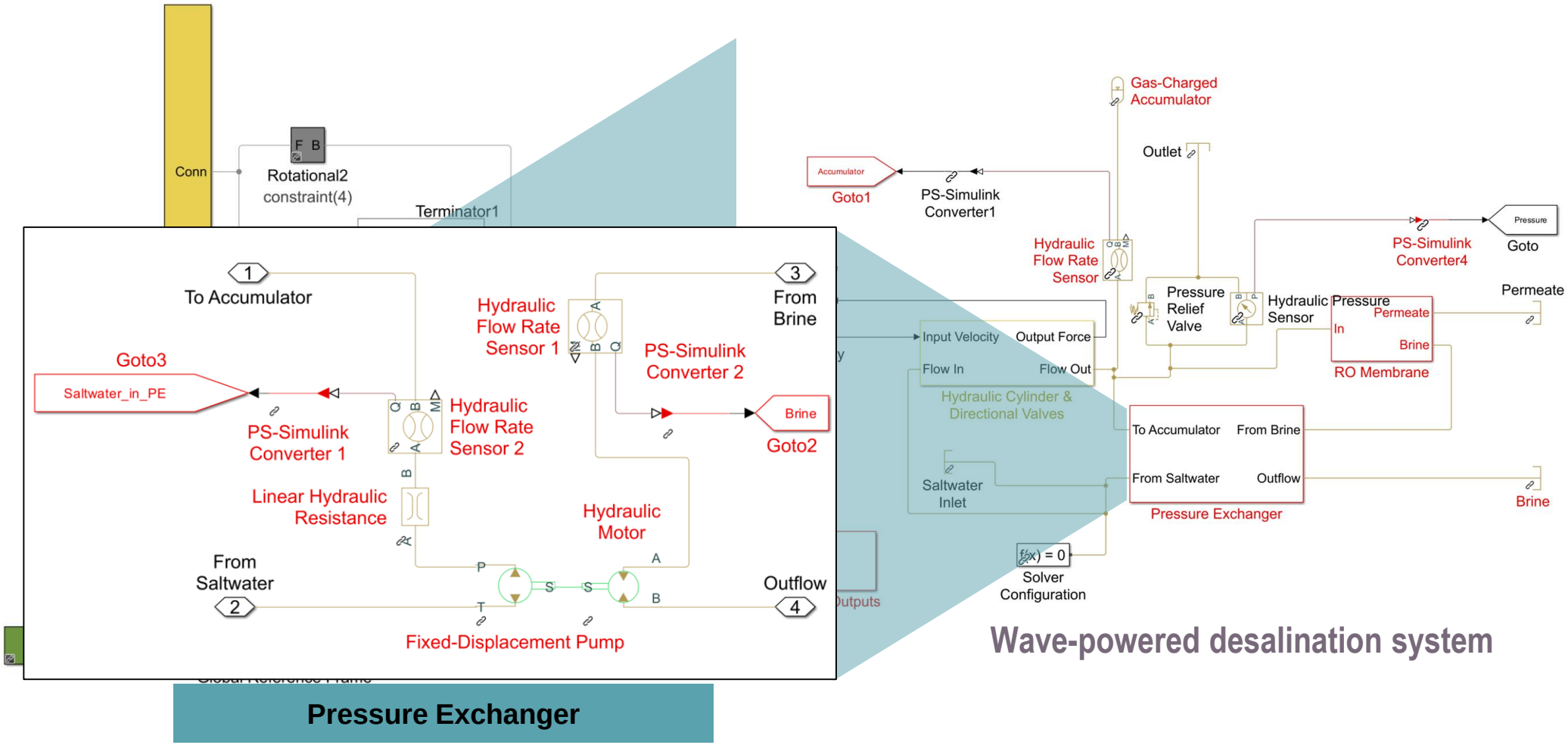
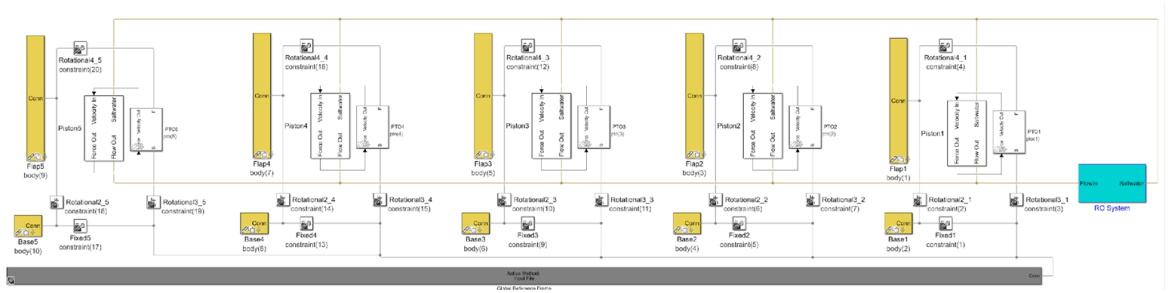
WEC-Sim Model

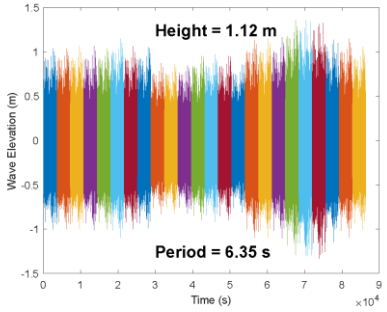


https://github.com/WEC-Sim/WEC-Sim_Applications/tree/master/Desalination

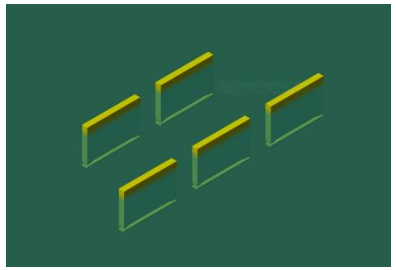
Wave-Powered Desalination Plant



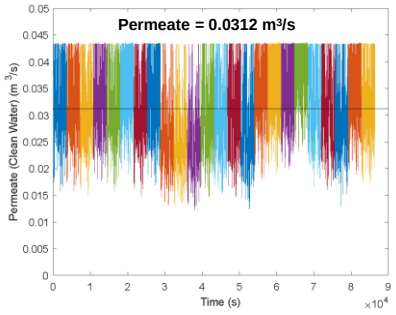
Wave Resource



Five WEC Farm



Desalination

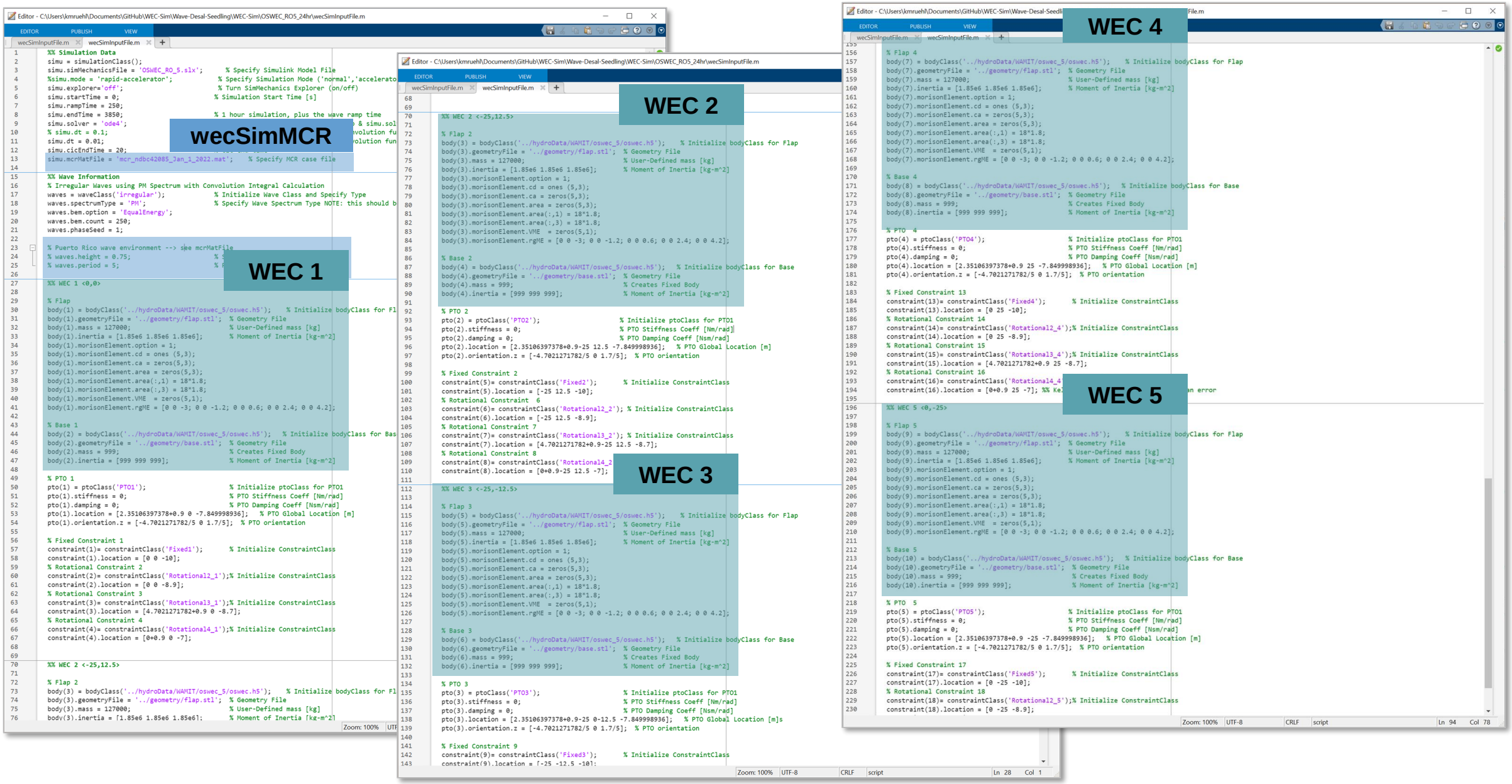


This model can be expanded to include multiple WECs, and for longer durations.

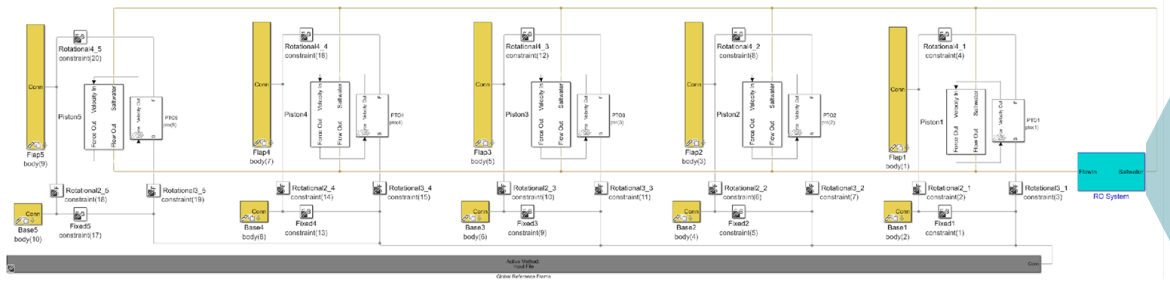
This WEC-Sim run includes five WECs, for a 24-hour simulation.

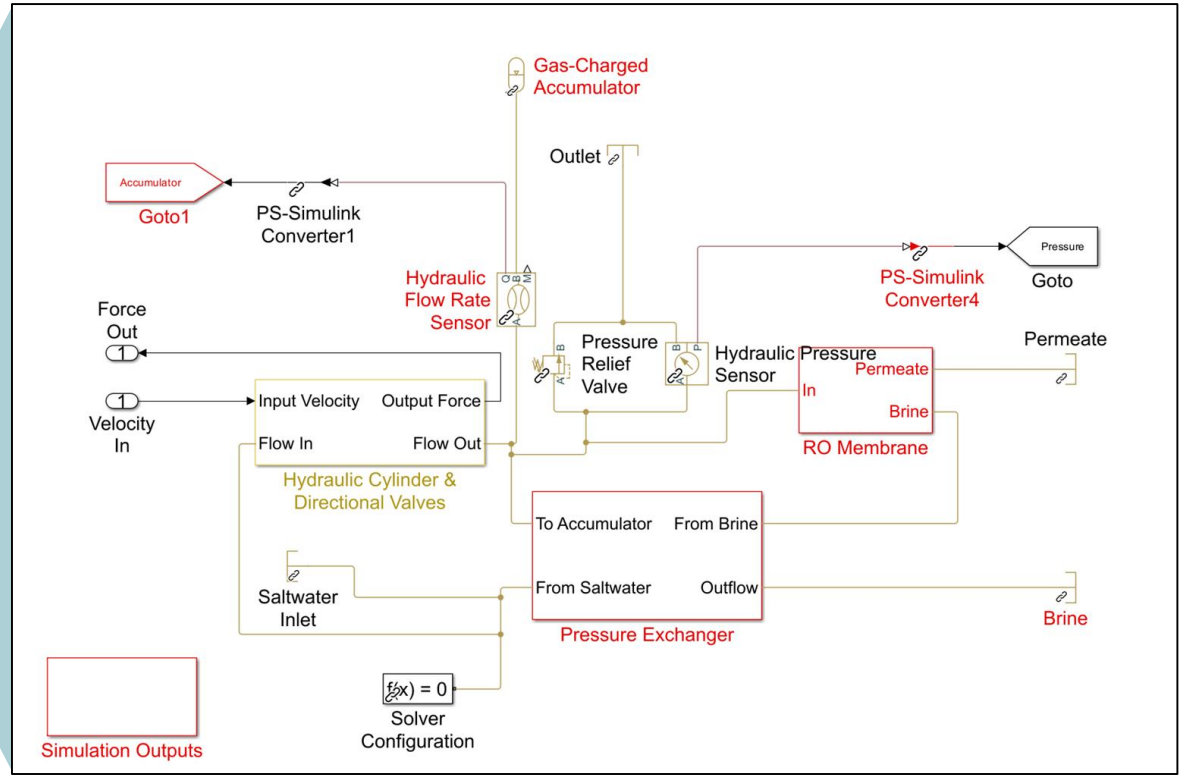
The permeate can then be used as an input to regional water networks models.

WEC-Sim Input File



WEC-Sim Model





Wave-powered desalination system

Thank you

For more information please visit the WEC-Sim website:

http://wec-sim.github.io/WEC-Sim

If you have questions on this presentation please reach out to any of the WEC-Sim Developers on GitHub:

https://github.com/WEC-Sim/WEC-Sim

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