



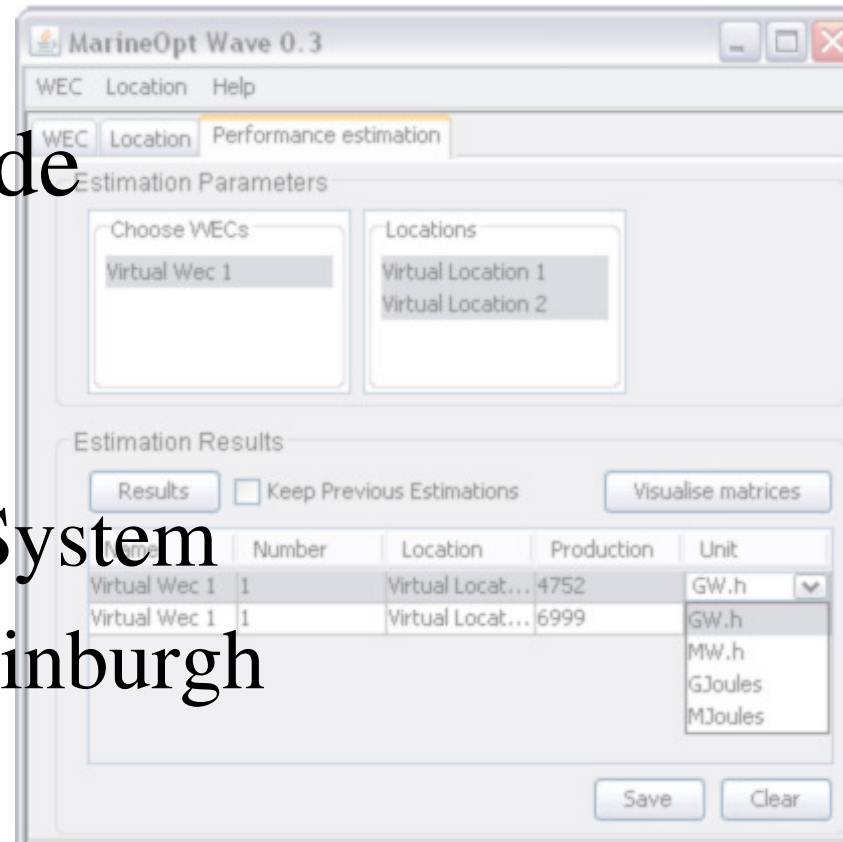
MarineOpt

Wave & Tide

Remy Pascal

Institute for Energy System

The University of Edinburgh



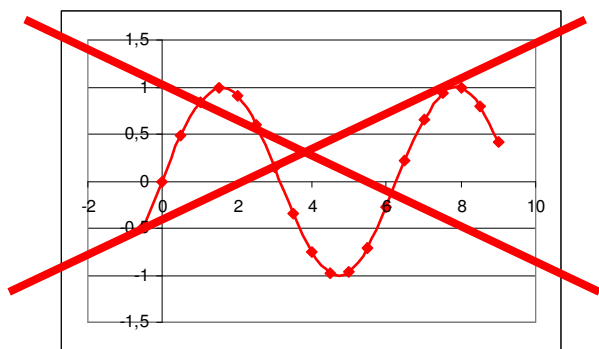


MarineOpt: filling a gap

- No easy and accessible tool for the investor or project developer for comparison of Marine Energy Converters
- Methods for evaluation are either:
 - Too simple to get a reliable picture.
 - Too complex to be applied to more than 1 device (models).

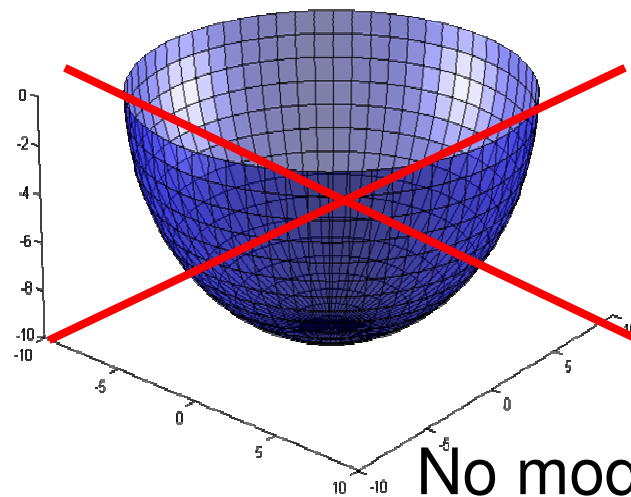
The Philosophy

MarineOpt philosophy: don't rely on confidential material,
use public domain information.



No Time series data

and



No models

Statistical description of the resource matching with
parametric description of the devices performances



MarineOpt Wave & Tide are:

- Two tools for:
 - Performance estimation of Marine Energy Converters
 - Direct comparison of devices relative to a location.
 - ➡ Choosing the best device for a location
- Based on:
 - Parametric description of the device performance and resource assessment.
 - Creation of a catalogue of MECs and Locations.
- With emphasis on an Easy to use Graphical User Interface

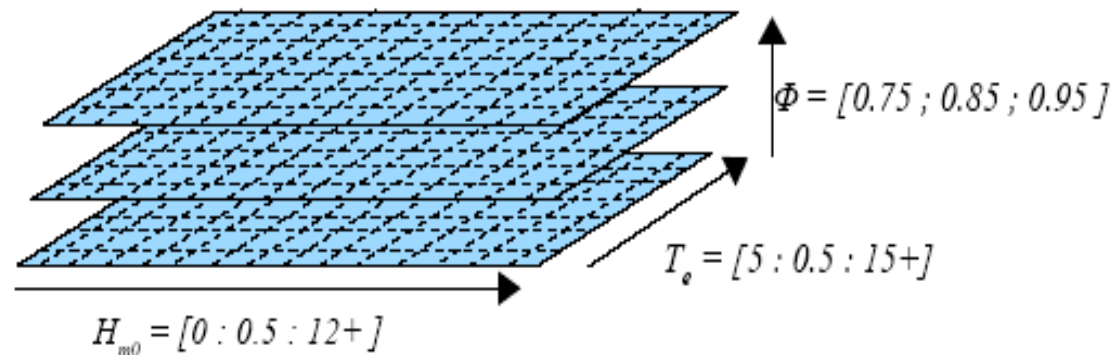
MarineOpt Wave:

→ Unfair comparison between omnidirectional wave energy converters and the other

Introduction of a spreading parameter.

↓ *a new concept:*

multi-layer
Power Matrix or
Scatter Diagram





MarineOpt Wave

- Possibility to use more than 1 power matrix and scatter diagram to adapt to different spectrum shape
- Main Hypothesis:
 - floating device aligned themselves with the main direction of propagation.
 - Onshore and near shore device: waves aligned themselves due to shallow water.

MarineOpt Wave: Main window



The screenshot shows the main window of MarineOpt Wave 0.91. The window has a title bar with the text "MarineOpt Wavev 0.91" and standard window controls. Below the title bar, there are three tabs: "WEC", "Location", and "Option". The "WEC" tab is selected, and within it, there are sub-tabs for "WEC", "Location", and "Performance estimation". The "Location" sub-tab is active, showing two list boxes: "Choose WECs" and "Locations". The "Choose WECs" list contains "test 1", "Test", and "Virtual Wec 1". The "Locations" list contains "Virtual Location 1". Below these lists is the "Estimation Results" section, which includes a "Results" button, a "Keep Previous Estimations" checkbox, and a "Visualise matrices" button. A table displays the results, with columns for Name, Number, Location, Production, and Unit. The table contains two rows: "Test" and "Virtual Wec 1". At the bottom of the window are "Save" and "Clear" buttons. Three callout boxes with arrows point to specific elements: "List of WECs" points to the "Choose WECs" list, "List of Locations" points to the "Locations" list, and "Table of results" points to the results table.

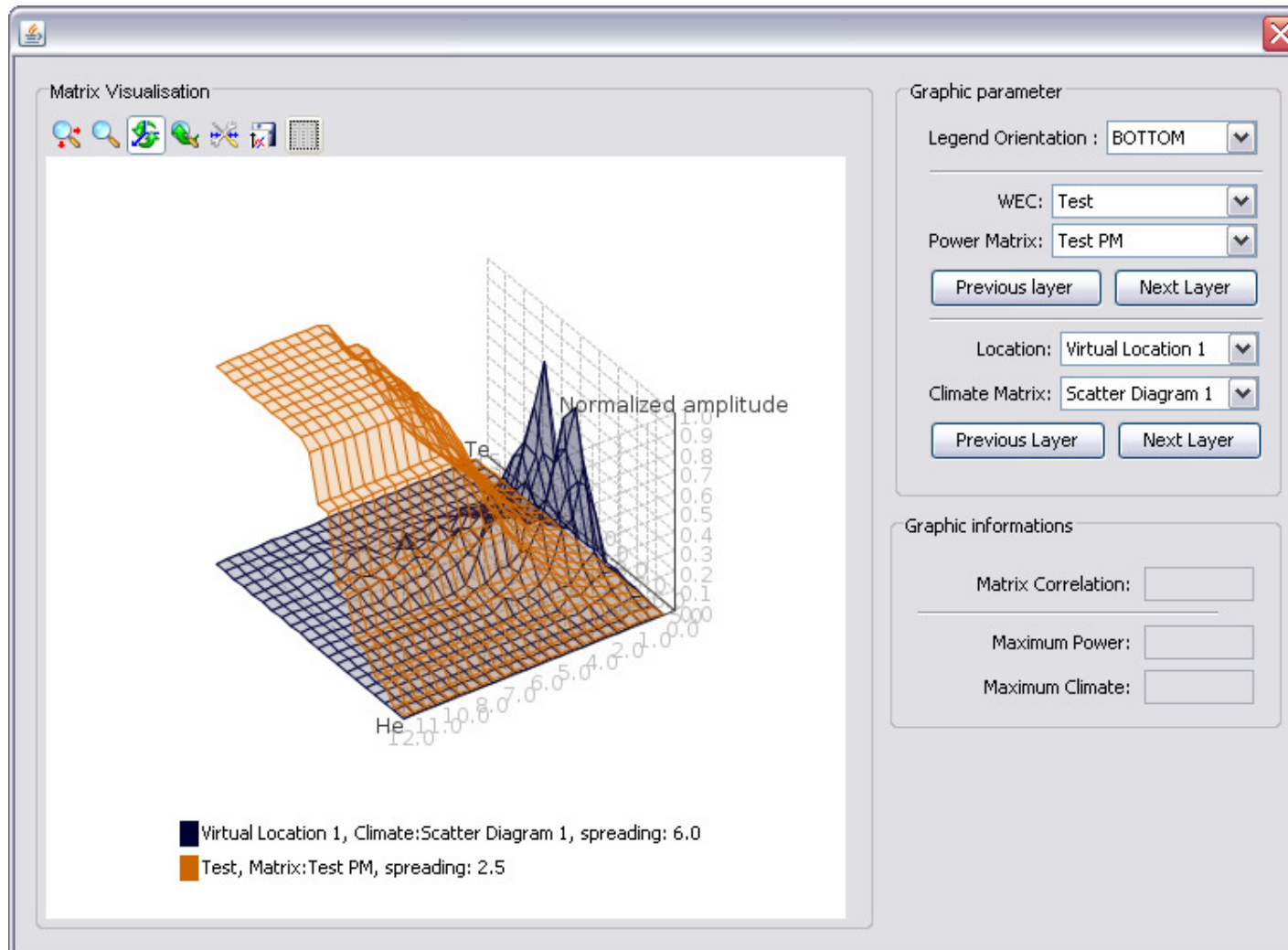
List of WECs

List of Locations

Table of results

Name	Number	Location	Production	Unit
Test	1	Virtual Locati...	77181190	MW.h
Virtual Wec 1	1	Virtual Locati...	77181190	MW.h

MarineOpt Wave: 3D visualisation



The future of MarineOpt Wave



- Development of MarineOpt Wave identified a lack of appreciation of the high importance of the different directional wave spectrum parameters.



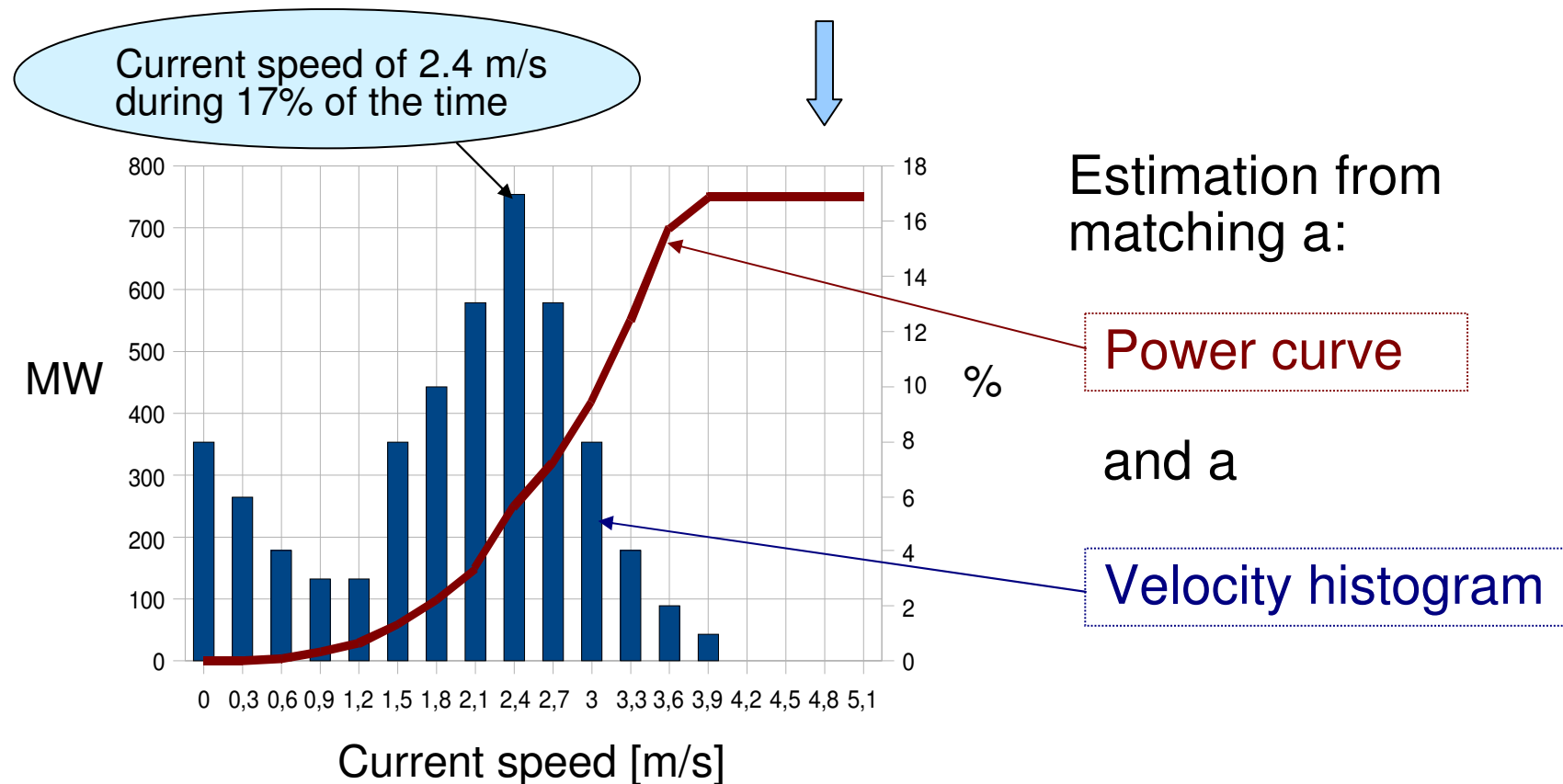
The needed knowledge will be developed under Supergen 2

Integration of the new knowledge in a future revision to MarineOpt Wave

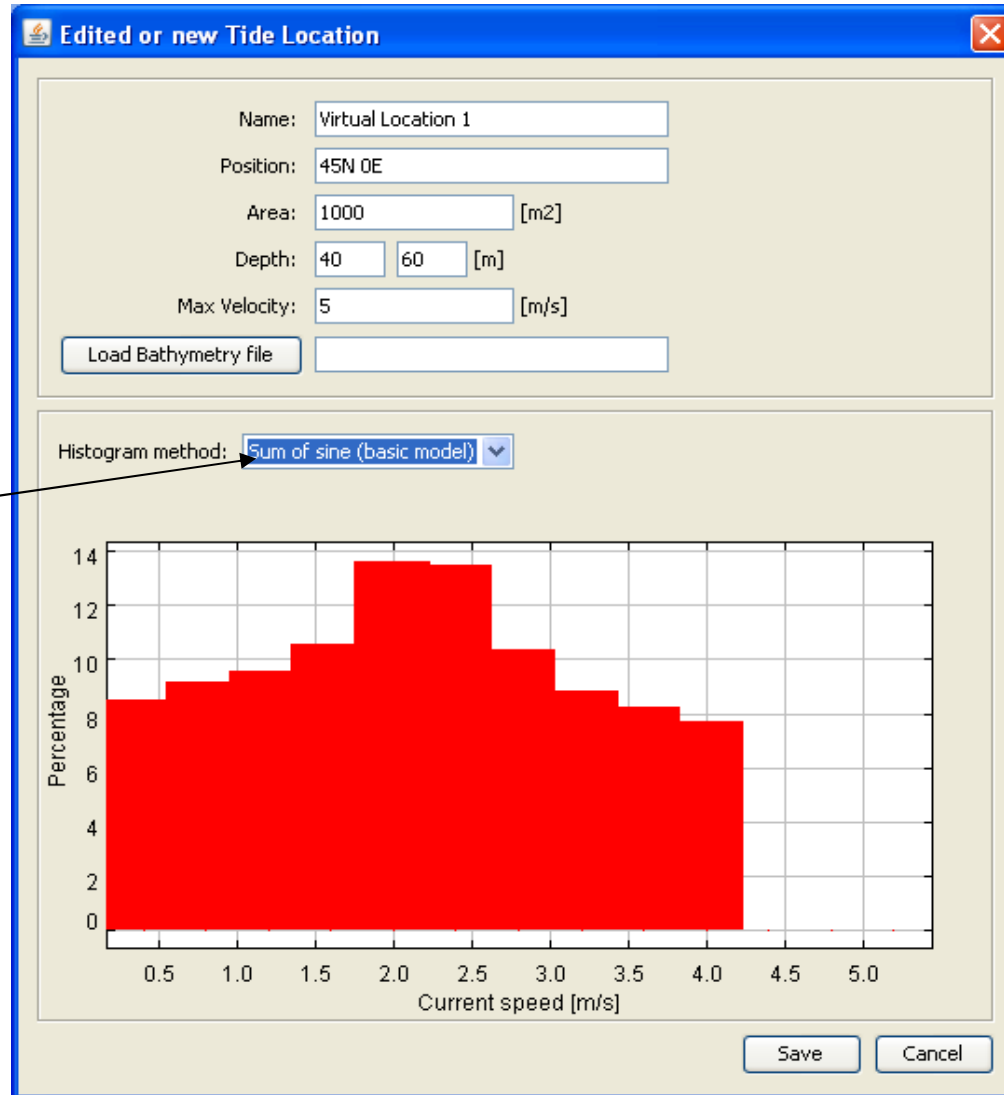
- Integration of new knowledge about arrays of WECs
- Integration of cost related issues for a fully integrated software

MarineOpt Tide:

- Less controversial parametric description of the resource and performance.

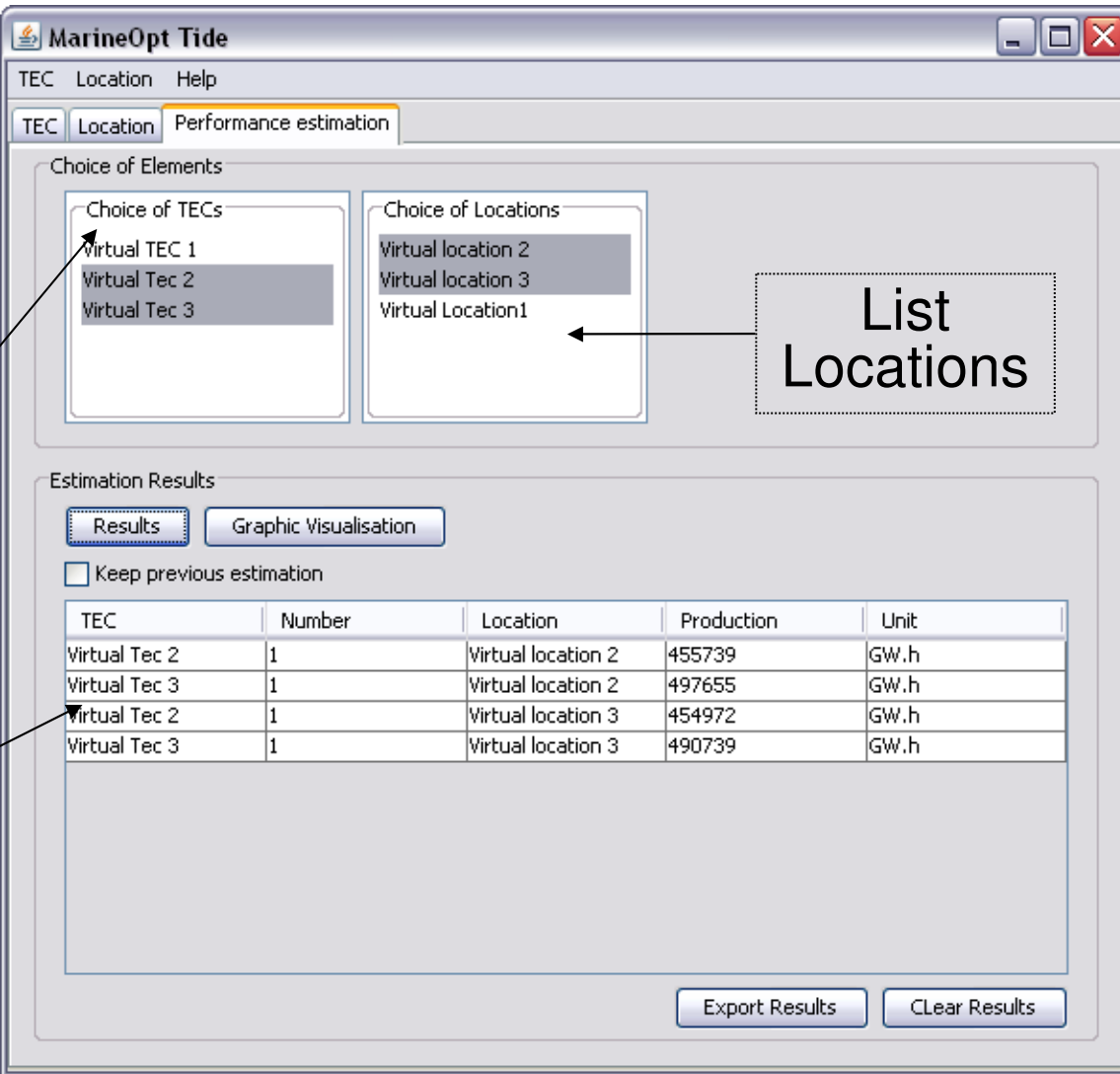


MarineOpt Tide: New Location



Histogram from file
or
sum of sine model

MarineOpt Tide: main window



The screenshot shows the 'MarineOpt Tide' application window. It has a menu bar with 'TEC', 'Location', and 'Help'. Below the menu bar are three tabs: 'TEC', 'Location', and 'Performance estimation'. The 'Performance estimation' tab is active. The main area is divided into two sections: 'Choice of Elements' and 'Estimation Results'. The 'Choice of Elements' section contains two list boxes: 'Choice of TECs' with items 'Virtual TEC 1', 'Virtual Tec 2', and 'Virtual Tec 3'; and 'Choice of Locations' with items 'Virtual location 2', 'Virtual location 3', and 'Virtual Location1'. The 'Estimation Results' section has buttons for 'Results' and 'Graphic Visualisation', a checkbox for 'Keep previous estimation', and a table of results. The table has columns for TEC, Number, Location, Production, and Unit. At the bottom right are buttons for 'Export Results' and 'Clear Results'. Three callout boxes with arrows point to specific elements: 'List TECs' points to the 'Choice of TECs' list, 'List Locations' points to the 'Choice of Locations' list, and 'Table of results' points to the results table.

List TECs

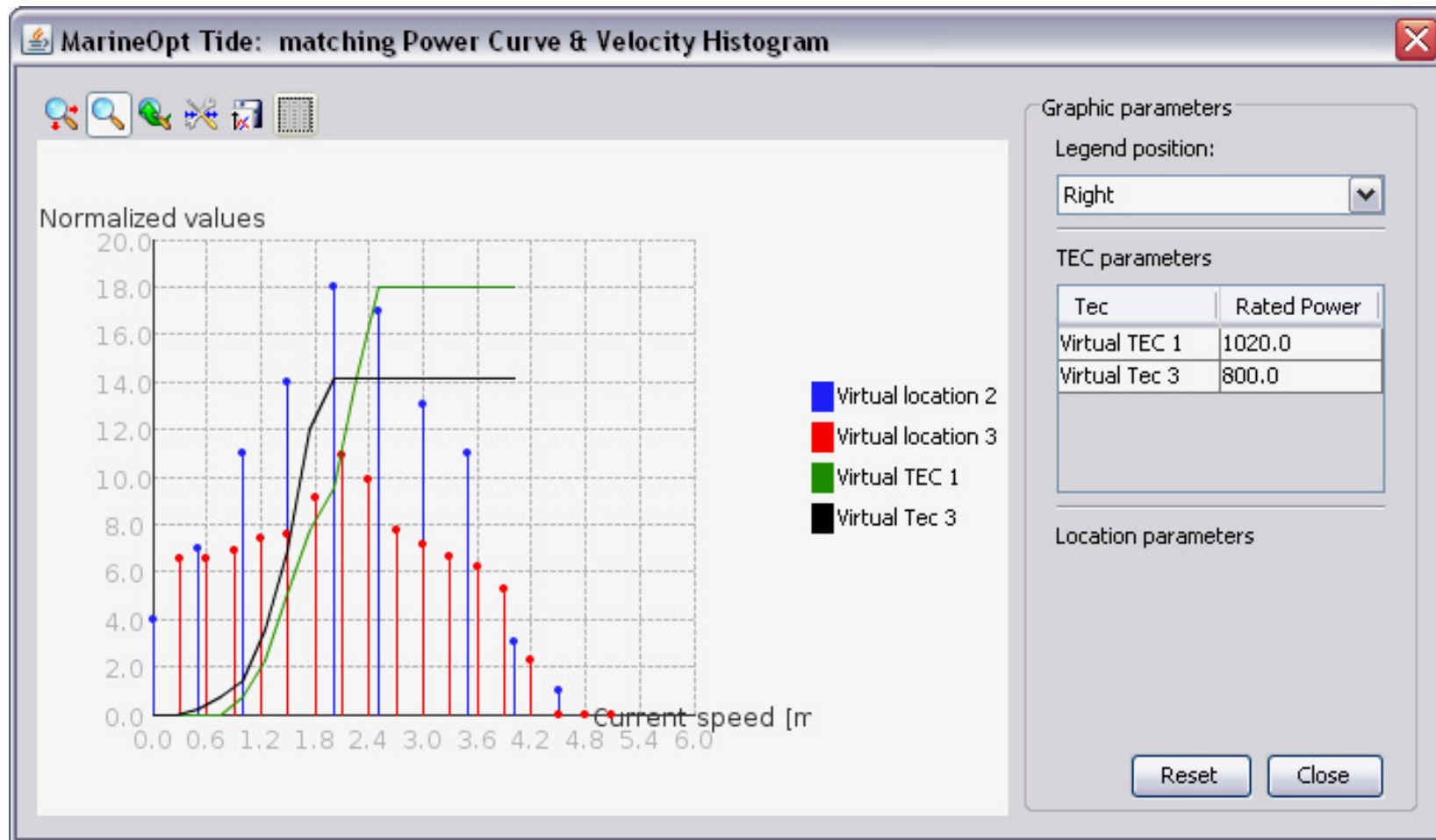
List Locations

Table of results

TEC	Number	Location	Production	Unit
Virtual Tec 2	1	Virtual location 2	455739	GW.h
Virtual Tec 3	1	Virtual location 2	497655	GW.h
Virtual Tec 2	1	Virtual location 3	454972	GW.h
Virtual Tec 3	1	Virtual location 3	490739	GW.h



MarineOpt Tide: Data Visualisation





The future of MarineOpt Tide

Future knowledge will enhance the performance of MarineOpt Tide.

- Introduction of knowledge about arrays of TECs
- Incorporation of knowledge relative to flow distortion and wake analysis.
- Incorporation of effect due to waves.

Most of this knowledge will be developed in Supergen 2.

- Introduction of cost related issues for a more complete software



Conclusion

- MarineOpt Wave and Tide are new easy to use tools for investors and project developers to explore performance of marine energy converters
- They use only public domain information.
- Version 1.0 are available for download on the web, complete with user manual.