in the present specification referring to the same type of devices which may be monitored using available sensors or detectors, such as gensets, batteries, fuel cell etc. and the term “consumers” may refer to thrusters, winches or other onboard equipment that may influence the power distribution and consumption on the vessel. The optimal power plant configuration/connections is used to improve overall fuel consumption and to determine the efficiency of the system.

The iEMS according to the invention is designed to be autonomous in decision making capability and therefore the balance profile feature is introduced to process the results of cost optimizer before sending the suggested configurations to the control system. The balance profile computes a combined index between the energy efficiency and vessel redundancy margin. This may be performed according to a predetermined set of rules or be based on analysis of previous incidents and store events, possibly in combination with user feedback related to the situations.

Summary of the Invention:

In a first aspect of the invention, there is a system for controlling a marine vessel comprising a number of devices, the devices including a number of power generators and consumers, further comprising sensors for monitoring the activity of the devices, the system including at least one processor calculating device score values of the devices. The system also includes a control unit connected to said devices and being configured to calculate an efficiency score value based on said device score values, the efficiency score value defining the efficiency of the system. The system also is configured to calculate the redundancy of the system based on the operation mode and/or load of the devices, and to calculate a redundancy margin index indicating the redundancy of the system devices, according to predetermined scores for each operation mode and computing the efficiency and redundancy values. The system also being configured to calculate a combined index based on the efficiency score value and redundancy margin index. The system includes a set of setup configurations for the devices included in the system, the system being

configured to, at the instance of the combined index being outside a predetermined range, calculating the combined index for at least one alternate device setup and indicating the preferred setup based on a comparison between the combined index values.

In a second aspect of the invention, there is a method for controlling a marine vessel comprising a number of devices, the devices including a number of power generators and consumers, as well as sensors for monitoring the activity of the devices, the method comprising the steps of: calculating a score value for each device, calculating an efficiency score value based on said device score values, the efficiency score value defining the efficiency of the system, calculating the redundancy of the system based on the operation mode and/or load of the devices, and a redundancy margin index indicating the redundancy of the devices according to predetermined scores for each operation mode and computing the efficiency and redundancy values, calculating a combined index based on the efficiency score value and redundancy margin index. The vessel includes a set of setup configurations for the devices included in the system, and, at the instance of the combined index being outside a predetermined range, calculating the combined index for at least one alternate device setup and indicating the preferred setup based on a comparison between the combined index values.

The present invention will be discussed more in detail with reference to the accompanying drawings, illustrating the invention by way of examples.

Figure 1 illustrates the iEMS and balance profile in a ship control system.

Figure 2 illustrates schematically the balance profile.

Figure 3 illustrates a flow chart of the iEMS and Balance profile in a DP operation.

Figure 4 illustrates a flow chart of the iEMS and Balance profile in a DP operation involving transit, standby, harbor and maneuvering.

A dependable power source is essential during vessel operations. The main function of an energy management system (EMS) is to manage the power generation systems safely, reliably, and economically on various types of vessels. It does so by using failure-proof energy management strategies that provide high availability of power, under all working conditions.