operate and be cooled, but naturally-generated electricity and cooling is insufficient to provide the needed cooling for the data center. In addition, such cooling may be used when pumping power is adequate, but sea water is not sufficiently cool to provide needed levels of cooling.

[0053] Where absorption chillers are employed, valving on pipes leading to heat exchangers may be provided to shift one or more heat exchangers from sea-water cooling to chiller cooling. For example, an open loop may exist on a heat exchanger by which sea water flows through one side of the exchanger, and cooling water that enters and leaves the data center flows through the other side. A side branch for the data center cooling water may extend to a heat exchanger whose second side is connected to an absorption chiller. When additional cooling is needed, the data center cooling water may be redirected in whole or in part from the first heat exchanger to the second. Additional heat exchangers may also be employed, so that changes from sea water cooling to chilled water cooling may be made gradually.

[0054] FIG. **1**B is a top view of a floating data center system **120** using a pair of motion-powered machines. In general, the floating data center system **120** has a floating platform **122** carrying a modular data center **124**. Motion-powered machines **125**, **132** may provide power and cooling capacity to floating platform **122**. The floating platform **122** may direct power and cooling capacity supplied by the motion-powered machines to the modular data center **124**. As a result, the floating data center system **120** may be able to operate without external connections for providing power or cooling.

[0055] The floating platform **122** may, for example, include a seagoing ship such as a freighter. The modular data center **124** may make use of shipping containers **126**, such as standardized intermodal freight containers, to hold the data center's equipment. The shipping containers **126** may be loaded and unloaded using conventional port equipment. In the event that one or more modules **126** of the data center **124** needs to be replaced, the floating data center system **120** may simply pull into a port and have the appropriate modules swapped out and replaced with new ones.

[0056] The motion-powered machines **125**, **132** may extend laterally from the floating platform **122**, for example, with one end connected to the rear of the floating platform and the other end anchored to the seabed. The motion-powered machines **125**, **132** may gather mechanical power from wave action and apply it to a purpose such as pumping fluids or generating electricity. The relative positioning of the floating platform **122** and the motion-powered machines **125**, **132** is shown here only for illustrative purposes; the actual alignment of the components will generally be established so as to provide for maximum energy generation, and for the proper operation of the platform **122** also.

[0057] The motion-powered machines **125**, **132** may have the ability to convert wave action to electricity and pumping capacity. For example, in some implementations, the motion-powered machine **132** may have a piston-powered pump **134** present in its first pontoon **132**A, and electric generators **136** present in its other pontoons **132**B, **132**C, **132**D.

[0058] The motion-powered machine may cool the modular data center **124** by pumping coolant. In some cases, the cooling system used in the floating data center system **120** may include an open loop. For example, a conduit **128** may be used to transfer a coolant such as subsurface seawater from a pump **134** located in the first section **132**A of the motion-powered machine **132**, to the floating platform **122**. In some instances, the motion-powered machine **125** may provide electrical power to drive a pump (not shown) onboard the floating platform **122**; the pump may draw in cool seawater through an intake pipe **130** that is used to cool the modular data center **124**. An intake pipe which extends below the surface of the water may draw up cooler water than water that is present at the surface, due to the differences in density between warm and cool water, and due to solar heating of the surface water. Seawater that is pumped into the floating data center **122** may be expelled overboard or underwater as the need arises after it has absorbed heat from the modular data center. Various mechanisms may also be employed to ensure adequate dispersion of the water.

[0059] In some instances, the cooling system used in the floating data center system **120** may include a closed loop. For example, a coolant, such as fresh water or ethylene glycol, may circulate between the motion-powered machine **125**, where it is cooled, and the modular data center **124**, where it absorbs excess heat from computing equipment. The conduit **128** may be segregated into separate channels which carry warm and cool coolant. The coolant may be carried to a heat exchanger located in the first pontoon **132**A of the motion-powered machine **132**. The heat may pass from the coolant on one side of the heat exchanger to seawater on the other side of the heat exchanger, thus cooling the coolant before it is pumped back to the floating data center.

[0060] In other implementations, a data center may be located on shore, close to a body of water. Power (whether electrical or mechanical) for the data center may be derived from water-based devices such as Pelamis machines of water-based wind generators. The power may then be transmitted to the data center on shore. Cooling water may also be pumped from the body of water to the on-shore data center.

[0061] FIG. **1**C is a top view of a floating data center system **150** powered by a tidal power system. In general, the tidal power system converts energy gathered from rising and falling tides into electricity. The electricity is passed to the floating data center system **150** where it is used to power and cool computing equipment.

[0062] In the figure, a floating data center system **150** includes a floating platform **152** carrying a modular data center **154**. The modular data center **154** may consist of one or more modules on the floating platform. The modules may be, for example, intermodal freight containers. The modules may contain computers and other equipment necessary for data center operations. Such equipment may include computing equipment such as racks of servers or hard drive arrays. The modules may also include communications equipment such as wireless base stations, modems, or any other related equipment. Alternatively, the modules may contain almost exclusive telecommunications equipment, such as switches, routers, and other structures.

[0063] A tidal basin **156** provides electrical power to the floating platform **152**. A channel **158** connects the basin **156** to the ocean, and a gate **160** controls the flow of water into and out of the basic **156**. A water-powered generator **162** gathers energy from water flowing in and out of the tidal basin **156**. In operation, the gate **160** may be held open when the tide is rising so that water fills the basin **156**. When the tide peaks, the gate may be closed. When the tide falls, water may be routed from the higher level in the basin **156** through turbines in the water-powered generator, similar in operation to how a dam operates. The gate **160** may also be closed as the tide rises, and higher ocean water may fall through turbines to