Claims

1. An apparatus (100) for simulating one or more eco habitat conditions employing pressurized water as a primary driver, said apparatus (100) comprising:

1)at least one eco capsule unit (102a-b) comprising:

a pressurized water driven turbine to create (110a-b) at least one low pressure vacuum chamber (106a-b), at least one pressurized humid air chamber (108a-b) separated by the pressurized water driven turbine (110a-b), wherein the pressurized water driven turbine (110a-b) is configured to receive pressurized water from a recycle water sump (400) and to receive air from an air inlet chamber (104), for generating a highly humidified pressurized air-vapor-pollutant-water droplet mixture by creating a turbulence;

said at least one vacuum chamber (106a-b) configured to enable at least one or a combination of: a) a wind chill effect simulation, b) a rain effect simulation and c) an evaporative cooling to enable air and water heat exchange, generating water with an adjustable temperature by controlling the rate of evaporation of water and the level of wind chill effect simulation;

said at least one pressurized humid air chamber (108a-b) configured to capture the highly humidified pressurized air-vapor-pollutant-water droplet mixture created from the turbulence from the pressurized water driven turbine (110a-b), for removing pollutants from the air absorbed into water droplets to generate purified air with a desirable temperature and a pressurized humid air-vapor mixture, the at least one pressurized humid air chamber coupled to:

a humid air exhaust heat remover (112) for expelling or recycling the pressurized humid air-vapor mixture or latent heat, to regulate humidity levels in an environment external to the apparatus; and

an air-blower (120) for expelling or recycling cooler and dryer air into an environment external to the apparatus, by passing the pressurized humid air vapor mixture through a length of metal pipe with fins partially exposed to a partial vacuum; and

2)said air inlet chamber (104) for receiving air from an environment external to the apparatus (100).

2. The apparatus (100) as claimed in claim 1, wherein one or more eco habitat conditions are simulated comprising a wind-chill effect simulation, an evaporative cooling, rain effect simulation in each at least one eco capsule unit, enabling air and water heat exchange.

3. The apparatus (100) as claimed in claim 1, wherein the humid air exhaust heat remover (112) is employed to expel or recycle pressurized humid air-vapor or latent heat to regulate humidity levels in an environment external to the apparatus (100).

4.The apparatus (100) as claimed in claim 1, further comprising at least one vacuum chamber spacer (114) for stacking two or more eco capsule units (120a-b) for improving performance of the apparatus (100).

5.The apparatus (100) as claimed in claim 1, wherein the recycle water sump (400) comprises a heating element as a source of heat for selectively heating the water in the recycle water sump (400), wherein the heating element comprises a submersible water pump (402).

6. The apparatus (100) as claimed in claim 1, wherein the recycle water sump (400) comprises an inlet vacuum cooling coil (404) for selectively controlling the water temperature of the water in the recycle water sump (400).

7.The apparatus (100) as claimed in claim 1, wherein the recycle water sump (400) further comprises an inlet volume control valve (406) that creates a degree of vacuum by restricting an inlet-capacity of the water pump (402) thereby creating a partial vacuum in the inlet vacuum cooling-coil (404), wherein by regulating the inlet volume the water-temperature in the recycle water sump (400) is adjusted.

8.The apparatus (100) as claimed in claim 1, further comprising a plurality of valves as a means for users to manage the selection or adjustment of one or more eco habitat conditions.

9.The apparatus (100) as claimed in claim 1, further comprising a cooler water return discharge tube (116a-b) for discharging the water with reduced temperature from the apparatus (100).

10.The apparatus (100) as claimed in claim 1, further comprising at least one ambient air inlet (118a-b) for simulating a wind chill effect.

11. The apparatus (100) as claimed in claim 1, wherein the air-blower (120) comprises at least one vapor-condenser or an air dryer chamber comprising a length of metal pipe with fins partially exposed to partial vacuum for expelling the pressurized humid air-vapor as cooler and drier cleaner air into an environment external to the apparatus (100).

12. The apparatus (100) as claimed in claim 1, wherein the humid air exhaust heat remover (112) is coupled to a venturi device (300) for recovering heat and vapor by bubbling into a water reservoir.

13. A method for simulating one or more eco habitat conditions employing pressurized water as the primary driver, said method comprising:

1) receiving (602) a pressurized water jet and air from an environment external to an eco-capsule unit;

2) said pressurized water jet propelling a pressurized water driven turbine, creating (604) at least one low pressure vacuum chamber and at least one pressurized humid air chamber, separated by the pressurized water driven turbine, and creating a turbulence for mixing up water, air and dust for generating a highly humidified air-vapor-pollutant-water droplet mixture;

3)performing (606) at least one of:

a) adjusting air and water temperatures through air and water heat exchange, by the at least one low pressure vacuum chamber, configured to enable at least one or a combination of: a wind chill effect simulation, a rain effect simulation and/or evaporative cooling to enable air and water heat exchange to generate a water with adjustable temperature, by controlling a rate of evaporation of water and a level of wind chill effect simulation; and

b) capturing the highly humidified air-vapor-pollutant-water droplet mixture created from the turbulence in the at least one pressurized humid air chamber for removing pollutants absorbed into water droplets from the air, via an air-blower comprising at least one vapor-condenser, to generate purified air with a desirable temperature and a pressurized humid air-water vapor; and

4)performing (608) at least one of:

a) expelling and recycling the pressurized humid air-water vapor mixture or latent heat into an environment external to the apparatus, by a humid

air exhaust heat remover coupled to the at least one pressurized humid air chamber to regulate humidity levels in the environment external to the apparatus; and

b) drying the purified air with desirable temperature and expelling or recycling cooler, drier, cleaner air to the environment external to the apparatus.

14. The method as claimed in claim 13, wherein subjecting the air for drying comprising:

passing the purified air into a drying chamber, wherein the drying chamber comprises a metal pipe with a plurality of fins along a length of the metal pipe;

exposing the air to partial vacuum to increase a rate of evaporation to generate cooler drier air; and

releasing the cooler drier air to the environment external to the apparatus.