

CLAIMS:

1. A mobile hybrid-powered atmospheric water generator system comprising:

5 a trailer structure provided with wheels having electromagnetic
brake system, and leg stabilizers with height adjustment jack, said trailer
structure supporting an atmospheric water generator unit that includes a
water purification system, and a power management system to power said
atmospheric water generator unit, wherein said power management
system includes a battery bank, a fuel-powered generator and a solar
10 array,

a stainless-steel water storage tank arranged at the front lower
portion of the trailer structure, an IoT-enabled monitoring and control
system, and a smart generator control system for the fuel-powered
generator, said IoT-enabled monitoring and control system facilitating
15 remote diagnostics and monitoring of the system operation,

wherein said water purification system includes:

an air filter where atmospheric air passes through to remove dust,
particulates, and airborne contaminants,

20 a series of parallel evaporator fins where filtered air passes and
water vapor condenses into water droplets,

a water collection tank where water droplets are collected,

a pre-filter assembly where water from the water collection tank
flows into through a solenoid valve, said pre-filter assembly responsible for
preliminary removal of coarse particles,

a series of vertically arranged filtration columns consisting of a first sediment filter for removing suspended solids, rust, and silt, a pre-carbon filter for adsorption of chlorine, volatile organic compounds (VOCs), odor compounds, and organic contaminants, and a second sediment filter for providing secondary particulate polishing to ensure consistent feed quality,

5 a reverse osmosis (RO) filter for removing dissolved solids, heavy metals, minerals, microorganisms, and impurities down to molecular scale, and

10 a light-emitting diode-ultraviolet (LED-UV) lamp chamber where permeate water exiting the RO system passes through, said LED-UV lamp chamber eliminates microbial contaminants by damaging Deoxyribonucleic Acid (DNA) structures, thereby ensuring biological safety of the purified water, the clean water exiting the LED-UV lamp chamber directed into the clean stainless-steel water storage tank.

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2. The mobile hybrid-powered atmospheric water generator system according to claim 1, wherein the trailer structure further includes automatic electric side awnings, pull-out stairs arranged at the sides and the rear thereof, slide-out shelves, a plurality of LED perimeter lighting, a front awning type door, and a rear awning type door, and water faucets provided on both sides of the structure in communication with the stainless-steel water storage tank and positioned at an upper portion from the slide-out shelves.

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3. The mobile hybrid-powered atmospheric water generator system according to claim 2, wherein the front and rear awning type doors are supported by a plurality of assisting struts.
- 5 4. The mobile hybrid-powered atmospheric water generator system according to claim 2, wherein the trailer structure further includes vent louvers to allow airflow within the atmospheric water generator unit.
- 10 5. The mobile hybrid-powered atmospheric water generator system according to claim 1, wherein the collection water tank is equipped with three water-level sensors, namely, a high-level switch, a middle-level switch, and a low-level switch.