Claims:

1. An atmospheric water generator system (100) comprising:

a solar heat unit (110) configured to receive solar radiation during solar hours and convert the received solar radiation (300) into heat;

a thermal storage unit (120) configured to receive the heat from the solar heat unit (110) during solar hours and store the received heat;

a desiccant unit (130) comprising a desiccant material (131), and configured to receive the heat from the thermal storage unit (120) or the solar heat unit (110), wherein the desiccant unit (130) is configured to undergo an adsorption mode (150) to adsorb air from the atmosphere and a desorption mode (160) to recover water vapor from the desiccant material (131); and

a condenser unit (140) configured to receive and facilitate condensation of water vapor and generate fresh water (205); and

wherein the solar heat unit (110) and the desiccant unit (130) are in fluidic communication with each other.

2. The system as claimed in claim 1, wherein the thermal storage unit (120) is sized to store heat for durations ranging from minutes to hours and configured to provide heat to the desiccant unit (130) during the solar hours and non-solar hours for facilitating water generation.

3. The system as claimed in claim 1, wherein the thermal storage unit (120) may comprise of a hot storage unit (121) and a cold storage unit (122).

4. The system as claimed in claim 1, wherein the condenser unit (140) is provided with fins to provide heat transfer area for transferring heat from the trapped air with water vapor (203) to atmospheric air (201), wherein the condenser unit (140) is actively or passively cooled.

5. The system as claimed in claim 1, wherein the desiccant unit (130) comprises at least one actuated element (500) which facilitates establishing and breaking the fluidic communication of the desiccant unit (130) with the atmospheric air (201).

6. The system as claimed in claim 1, wherein the desiccant unit (130) further comprises at least one fan (510) for facilitating forced convection across desiccant material (131).

7. The system as claimed in claim 1, wherein the desiccant unit (130) comprises an adsorption section (132) for performing the adsorption mode (150) and a desorption section (133) for performing the desorption mode (160).

8. The system as claimed in claim 1, wherein the adsorption section (132) is in the fluidic communication with the atmospheric air (201) and the desorption section (133) is sealed from the atmospheric air (201) and is in fluidic communication with the condenser unit (140).

9. The system as claimed in claim 1, wherein the desiccant unit (130) is configured to facilitate a simultaneous operation of the adsorption mode (150) and the desorption mode (160) in a continuous manner.

10. The system as claimed in claim 1, wherein the desiccant unit (130) undergoes the adsorption mode (150) and the desorption mode (160) in a periodic manner, making the atmospheric water generator system generate water batch-wise.

11. The system as claimed in claim 1, wherein the desiccant material (131) is a solid or liquid substance to adsorb atmospheric water vapor, selected from a group consisting of but not limited to Silica-gel, calcium chloride, activated carbon, zeolites, hydrogels, glycols, and metal-organic frameworks.

12. The system as claimed in claim 1, wherein the solar heat unit (110) comprises flat plate solar collectors or evacuated tube collectors for capturing solar radiation.

13. The system as claimed in claim 1, wherein the solar heat unit (110) further comprises a reflective element (115) to capture more solar radiation (300).

14. The system as claimed in claim 1, wherein the system (110) comprises a heat transfer fluid (111) used to collect the heat from solar radiation (300) in a solar heat unit (110) and is stored in the thermal storage unit (120), wherein the heat transfer fluid (112) transfers the heat to the desiccant material (131) in the desiccant unit (130).

15. The system as claimed in claim 1, wherein the system further comprises one or more valves (500) to establish and break the fluidic communication between the solar heat unit (110), the thermal storage unit (120), the desiccant unit (130) and the condenser unit (140).

16. The system as claimed in claim 1, wherein the system further comprises solar photovoltaic cells (700) and battery storage (701) to supply electricity to the system.

17. A method (1300) of generating water from air using solar energy, the method comprising:

receiving, by a solar heat unit (110), a solar radiation during solar hours and converting the received solar radiation into heat (1310);

receiving, by a thermal storage unit (120), the heat from the solar heat unit during solar hours and storing the received heat (1320);

receiving, by a desiccant unit (130), the heat from the thermal storage unit or the solar heat unit, where the desiccant unit (130) comprises a desiccant material which undergo an adsorption mode (150) to adsorb air from the atmosphere and a desorption mode (160) to recover water vapor from humidity in adsorbed air (1330);

receiving, by a condenser unit (140), the water vapor and facilitating condensation of water vapor and generating fresh water (1340); and

facilitating a fluidic communication between the solar heat unit (110) and the desiccant unit (130).

18. The method as claimed in claim 17, wherein in the step storing the received heat by the thermal storage unit, wherein the method comprises facilitating the incorporation of a hot

storage unit (121) and a cold storage unit (120), wherein the method comprises facilitating a provision to store heat in the thermal storage unit (120) for durations ranging from minutes to hours, wherein the method comprises facilitating water generation in the non-solar hours by providing heat from the thermal storage unit (120) to the desiccant unit (130) via the heat transfer fluid.

19. The method as claimed in claim 17, wherein, the method comprises facilitating the desiccant unit (130) to undergo the adsorption mode (150) and the desorption mode (160) either in periodic manner, making the atmospheric water generator system generate water batch-wise or performing simultaneous operation of the adsorption mode (150) and the desorption mode (160) in the desiccant unit (130) in a continuous manner.

20. The method as claimed in claim 17, wherein the method comprises facilitating electricity using a plurality of solar photovoltaic cells (700) and a battery storage (701).