CLAIMS

1. Cultivation structure (200) comprising an area for cultivation connected to a subterranean thermal energy storage (300), the structure comprising:

a heating-cooling system for controlling an indoor climate of the structure,

wherein the heating-cooling system is arranged to cool air in the structure by transporting heat from the air in the structure into the subterranean thermal energy storage, and

wherein the heating-cooling system is arranged to heat air in the structure by transporting heat from the subterranean thermal energy storage into the structure,

characterized in that

the cultivation structure (200) is arranged to not be opened up in order to let air out, and

the heating-cooling system comprises at least one heater-cooler unit (280) being arranged to retrieve water from the air of the structure by transforming vapor in the air of the structure into water.

2. Cultivation structure according to claim 1, further comprising:

the subterranean thermal energy storage having a vertical temperature gradient,

the heating-cooling system comprising a circulation system arranged to retrieve a fluid from a first vertical level in the subterranean thermal energy storage, to circulate the fluid in the structure such that heat and/or cold is exchanged between the fluid and the air in the structure, and to return the fluid to a second vertical level in the subterranean thermal energy storage.

3. Cultivation structure according to any one of the preceding claims, further comprising:

a plurality of light sources arranged to illuminate the area for cultivation, and a plurality of solar cells (212, 232) arranged in connection to the structure and arranged to supply the plurality of light sources with power.

4. Cultivation structure according to any one of the preceding claims, further comprising:

the heating-cooling system comprising a control system being arranged to control the indoor climate and being arranged to control at least one of humidity, temperature, light, and carbon dioxide in the cultivation structure.

5. Cultivation structure according to claim 4, further comprising:

the control system comprising a plurality of measuring units arranged to measure at least one of temperature, humidity, light, and carbon dioxide.

6. Cultivation structure according to any one of claims 3-5, further comprising:

the subterranean thermal energy storage having a vertical temperature gradient and an internal combined heating and cooling machine,

said internal combined heating and cooling machine being adapted for retrieving a fluid having a first temperature from the energy storage, and returning heated fluid having a second higher temperature and cooled fluid having a third lower temperature, and

the plurality of solar cells being arranged to supply the internal combined heating and cooling machine with power.

7. Cultivation structure according to any one of the preceding claims, further comprising:

the structure being at least one from a building, a part of a building, a green house, a tunnel, a part of a tunnel, a covered pit, and an extraterrestrial covered crater.

8. Cultivation structure according to any one of the preceding claims, wherein

the structure comprises a plurality of climate zones, the climate zones having different temperatures.

9. Cultivation structure according to claim 8, the climate zones being vertically and/or horizontally arranged.

10. Cultivation structure according to any one of the preceding claims, further comprising the heating-cooling system comprising a cooler unit arranged in connection to the structure,

wherein the cooler unit is arranged to retrieve heat from air outside the structure, and

wherein the heating-cooling system is arranged to transport the retrieved heat into the subterranean thermal energy storage.

11. Cultivation structure according to any one of the preceding claims, further comprising:

an irrigation system, the irrigation system being connected to the heating-cooling system and arranged to transport retrieved water from the heating-cooling system to the area for cultivation.

12. Cultivation structure according to claim 11, further comprising a rain collector arranged to retrieve water from rain, the rain collector being connected to the irrigation system and/or the heating-cooling system.

13. Cultivation structure according to any one of claims 11-12, the irrigation system and/or the heating-cooling system being connected to an external water system and being arranged for providing retrieved water to the external water system.

14. Cultivation structure according to any one of claims 11-13 when dependent on claim 3, further comprising:

the area for cultivation comprising a plurality of sub-areas, the sub-areas being arranged at a plurality of levels in the structure, and at least one of:

the plurality of light sources being arranged to illuminate the plurality of sub-areas, and

the irrigation system being arranged to irrigate the plurality of sub-areas.

15. Method for operating a cultivation structure (200) comprising an area for cultivation, the method comprising:

a heating-cooling system cooling air in the structure by transporting heat from the air in the structure into a subterranean thermal energy storage (300), and/or

the heating-cooling system heating the air in the structure by transporting heat from the subterranean thermal energy storage into the structure,

characterized by

the cultivation structure (200) being arranged to not be opened up in order to let air out, and

at least one heater-cooler unit (280) of the heating-cooling system retrieving water from the air of the structure by transforming vapor in the air of the structure into water.

16. Method according to claim 15, further comprising a circulation system:

retrieving a fluid from a first vertical level in the subterranean thermal energy storage,

circulating the fluid in the structure such that heat and/or cold is exchanged between the fluid and the air in the structure, and

returning the fluid to a second vertical level in the subterranean thermal energy storage.