CLAIMS

1. A method for operating an internal combustion engine of a watercraft comprising:

splitting water into hydrogen and oxygen in an electrolysis unit configured for production of the hydrogen;

extracting carbon dioxide from ambient air at a carbon dioxide sorption unit;

feeding the hydrogen and the carbon dioxide to a methanol synthesis unit, wherein the methanol synthesis unit synthesizes the hydrogen and the carbon dioxide into methanol; and

converting absorbed solar energy at a photovoltaic unit into electrical energy, wherein the electrolysis unit, the carbon dioxide sorption unit and the methanol synthesis unit are powered by the electrical energy generated in the photovoltaic unit, wherein the methanol is transported by a distribution system to a tank of the watercraft, and wherein the methanol is supplied from the tank as fuel for combustion to the internal combustion engine for generation of mechanical energy, wherein the internal combustion engine is part of a power unit of a hybrid electrically powered watercraft, and wherein the mechanical energy of the internal combustion engine is converted by the power unit into electrical drive energy for propulsion of the watercraft, wherein the carbon dioxide sorption unit maintains a closed-loop carbon dioxide cycle with the ambient air and the methanol combustion.

2. The method according to Claim 1, wherein the internal combustion engine is a reciprocating piston engine configured to operate with a compression ratio of at least 14:1.

3. The method according to Claim 2, further comprising:

splitting part of the methanol into a synthesis gas including hydrogen and carbon monoxide at a splitting unit arranged in the watercraft; and

feeding the synthesis gas into the reciprocating piston engine.

4. A method of producing methanol for use as fuel in an internal combustion engine of a watercraft comprising:

splitting water into hydrogen and oxygen in an electrolysis unit configured for production of hydrogen;

extracting carbon dioxide from ambient air at a carbon dioxide sorption unit;

feeding the hydrogen and the carbon dioxide to a methanol synthesis unit, the methanol synthesis unit synthesizing the hydrogen and the carbon dioxide into methanol; and

converting absorbed solar energy at a photovoltaic unit into electrical energy, wherein the electrolysis unit, the carbon dioxide sorption unit and the methanol synthesis unit are powered by the electrical energy generated in the photovoltaic unit, wherein the internal combustion engine is part of a power unit of a hybrid electrically powered watercraft, and wherein the mechanical energy of the internal combustion engine is converted by the power unit into electrical drive energy for propulsion of the watercraft, wherein the carbon dioxide sorption unit maintains a closed-loop carbon dioxide cycle with the ambient air and the methanol combustion.

5. The method according to Claim 4, further comprising:

transporting the methanol by a distribution system to a tank of the watercraft; and

feeding the methanol from the tank to the internal combustion engine configured to combust the methanol for generation of mechanical energy.

6. The method according to Claim 4, wherein the water is desalinated in a seawater desalination unit and fed to the electrolysis unit, and wherein the seawater desalination unit is operated by the electrical energy generated in the photovoltaic unit.

7. Apparatus configured to operate an internal combustion engine of a watercraft comprising:

an electrolysis unit configured to split water into hydrogen and oxygen for production of hydrogen;

a carbon dioxide sorption unit configured to extract carbon dioxide from ambient air;

a methanol synthesis unit configured for the production of methanol using the hydrogen and the carbon dioxide, wherein the methanol synthesis unit synthesizes the

hydrogen and the carbon dioxide into the methanol; and

a photovoltaic unit configured to convert absorbed solar energy into electrical energy, wherein the electrolysis unit, the carbon dioxide sorption unit and the methanol synthesis unit are powered by the electrical energy generated in the photovoltaic unit, wherein the methanol is transported by a distribution system to a tank of the watercraft, and wherein the methanol is supplied from the tank as fuel for combustion to the internal combustion engine for generation of mechanical energy, wherein the water is desalinated in a seawater desalination unit and fed to the electrolysis unit, and wherein the seawater desalination unit is operated by the electrical energy generated in the photovoltaic unit, wherein the carbon dioxide sorption unit maintains a closed-loop carbon dioxide cycle with the ambient air and the methanol combustion.

8. The apparatus according to Claim 7, wherein the internal combustion engine is part of a power unit of a hybrid electrically powered watercraft, and wherein the mechanical energy of the internal combustion engine is converted by the power unit into electrical drive energy for propulsion of the hybrid electrically powered watercraft.

9. The apparatus according to Claim 7, wherein the internal combustion engine is a reciprocating piston engine configured to operate with a compression ratio of at least 14:1.

10. The apparatus according to Claim 9, further comprising:

a splitting unit arranged in the hybrid electrically powered watercraft, the splitting unit configured to split part of the methanol into a synthesis gas including hydrogen and carbon monoxide, and wherein the synthesis gas is fed into the reciprocating piston engine.

11. Apparatus configured to produce methanol for use as fuel in an internal combustion engine of a watercraft comprising:

an electrolysis unit configured to split water into hydrogen and oxygen for production of hydrogen;

a carbon dioxide sorption unit configured to extract carbon dioxide from ambient air;

a methanol synthesis unit using a supply of the hydrogen and the carbon dioxide,

wherein the methanol synthesis unit synthesizes the hydrogen and the carbon dioxide into methanol; and

a photovoltaic unit configured to convert absorbed solar energy into electrical energy, wherein the electrolysis unit, the carbon dioxide sorption unit and the methanol synthesis unit are powered by the electrical energy generated in the photovoltaic unit, wherein the internal combustion engine is part of a power unit of a hybrid electrically powered watercraft, and wherein the mechanical energy of the internal combustion engine is converted by the power unit into electrical drive energy for propulsion of the watercraft, wherein the carbon dioxide sorption unit maintains a closed-loop carbon dioxide cycle with the ambient air and the methanol combustion.

12. The apparatus according to Claim 11, further comprising:

a distribution system adapted to transport the methanol to a tank of the watercraft, wherein the methanol is fed from the tank as fuel for combustion to the internal combustion engine for generation of mechanical energy.

13. The apparatus according to Claim 11, wherein the water is desalinated in a seawater desalination unit and fed to the electrolysis unit, and wherein the seawater desalination unit is operated by the electrical energy generated in the photovoltaic unit.

14. A method for operating an internal combustion engine of a watercraft comprising:

splitting water into hydrogen and oxygen in an electrolysis unit configured for production of the hydrogen;

extracting carbon dioxide from ambient air at a carbon dioxide sorption unit;

feeding the hydrogen and the carbon dioxide to a methanol synthesis unit, wherein the methanol synthesis unit synthesizes the hydrogen and the carbon dioxide into methanol; and

converting absorbed solar energy at a photovoltaic unit into electrical energy, wherein the electrolysis unit, the carbon dioxide sorption unit and the methanol synthesis unit are powered by the electrical energy generated in the photovoltaic unit, wherein the methanol is transported by a distribution system to a tank of the watercraft, and wherein the methanol is supplied from the tank as fuel for combustion to the internal combustion engine for generation of mechanical energy, wherein the water is desalinated in a

seawater desalination unit and fed to the electrolysis unit, and wherein the seawater desalination unit is operated by the electrical energy generated in the photovoltaic unit, wherein the carbon dioxide sorption unit maintains a closed-loop carbon dioxide cycle with the ambient air and the methanol combustion.