Claims

1. An energy supply system ~~(2),~~ ~~with~~comprising:

a first energy supply network ~~(4)~~ in the form of a power network ~~(36)~~ for transporting electrical energy ~~(46)~~;

a second energy supply network ~~(6)~~ with a transport system ~~(60)~~ for fluid operating materials ~~(58)~~;

a transport system ~~(62)~~ for returning carbon dioxide-containing residual gases ~~(58)~~ that occur during ~~the~~ energetic utilization of the fluid operating materials at one or more energy consumers ~~(11, 10)~~; and

at least one energy-generating unit ~~(8)~~ with which the fluid operating materials can be produced from carbon-containing material ~~(50, 54, 58)~~ and fed into the second energy supply network;

~~characterized by~~wherein at least one local energy management unit ~~(10)~~ for supplying a local energy supply network ~~(29)~~ with which the fluid operating materials taken from the second energy supply network can be converted into electrical energy ~~(74, 76, 78)~~ and fed into a local power network ~~(90)~~,

wherein the at least one energy management unit ~~(10)~~ comprises devices for extracting electric current ~~(46)~~ from the ~~higher-level~~ power network of the first energy supply network ~~(4, 36)~~ of the energy supply system ~~(2)~~, converting it into lower-voltage electric current, and feeding this lower-voltage electric current ~~(47)~~ into a power network ~~(90)~~ of the local energy supply network; as well as devices for extracting the fluid operating materials ~~(56)~~ from the transport system ~~(6, 60)~~ for fluid operating materials of the energy supply system, for generating electric current ~~(47)~~ from said fluid operating materials, and for feeding the electric current into said power network of the local energy supply network; and devices for collecting residual gases ~~(58)~~ occurring during the energetic utilization of the fluid operating materials ~~(56)~~ in the energy management unit ~~(10)~~, and for returning these residual gases to the residual gas transport system ~~(6, 62)~~ of the energy supply system ~~(2)~~;

by a control unit ~~(9)~~ of the energy supply system ~~(2)~~ that can communicate via a communication network ~~(16)~~ with the at least one energy-generating unit ~~(8)~~ and the at least one energy management unit ~~(10)~~ or with another energy consumer ~~(11)~~ of the energy supply system ~~(2)~~ and is set up for the purpose of controlling the operation of the various units ~~(8, 10, 11)~~; and

by a control system ~~(70)~~ of the at least one energy management unit ~~(10)~~ that is set up for the purpose of communicating via the communication network ~~(16)~~ with the control unit ~~(9)~~ of the energy supply system;~~.~~

~~2. The energy supply system as set forth in claim 1,~~ wherein the control unit ~~(9)~~ of the energy supply system ~~(2) is set up for the purpose of controlling~~controls the delivery rates of electric current ~~(46)~~ from the ~~higher-level~~ power network ~~(4, 36)~~of the first energy supply network and of fluid operating materials ~~(56)~~ from the ~~operating material transport system (6, 60)~~second energy supply network such that a maximally small dimensioning of the second energy supply network ~~(6, 60)~~ is achieved in relation to the line cross section and/or the operating pressure.

2~~3~~. The energy supply system as set forth in claim 1 ~~or 2~~, wherein the control unit ~~(9)~~ of the energy supply system ~~(2) is set up for the purpose of controlling~~controls the delivery rates of electric current ~~(46)~~ from the higher-level power network ~~(4, 36)~~ and of fluid operating materials ~~(56)~~ from the operating material transport system ~~(6, 60)~~ such that a maximally uniform loading of the corresponding supply networks ~~(6, 60)~~ over time is achieved.

3~~4~~. The energy supply system as set forth in ~~any one of the preceding~~ claim~~s~~ 1, wherein the at least one energy-generating unit ~~(8) is set up for the purpose of extracting~~extracts residual gas ~~(58)~~ from the residual gas transport system ~~(62)~~ and uses~~using~~ its carbon-containing fractions to produce the fluid operating materials ~~(56)~~.

4~~5~~. The ~~an~~ energy supply system as set forth in ~~any one of the preceding~~ claim~~s~~ 1, further comprising~~with~~ a system ~~(44)~~ for the electrolytic production of hydrogen gas ~~(48)~~ for use in the manufacture of the fluid operating materials ~~(56)~~.

5~~6~~. The energy supply system as set forth in ~~any one of the preceding~~ claim~~s~~ 1, wherein the at least one energy-generating unit ~~(8) has~~includes a utilization system ~~(37)~~, with a first subunit ~~(38)~~ for performing pyrolysis of carbon-containing material ~~(50)~~ into pyrolysis coke ~~(50)~~ and pyrolysis gas ~~(52)~~; a second subunit ~~(40)~~ for performing a gasification of the pyrolysis coke ~~(50)~~ into synthesis gas ~~(53)~~ and residues ~~(55)~~; and a third subunit ~~(42)~~ for performing a conversion of the synthesis gas ~~(53)~~ into fluid operating materials ~~(56)~~, return gas ~~(54)~~ being left over; and wherein all three subunits are closed in a pressure-tight manner and form a closed circuit; a transport line for the pyrolysis gas connects the first subunit to the second subunit and/or with to the third subunit; a transport line for the synthesis gas that connects the second subunit in a pressure-tight manner to the third subunit and/or to the first subunit; and a transport line for the return gas that connects the third subunit in a pressure-tight manner to the first subunit and/or to the second subunit; and wherein the hydrogen gas ~~(48)~~ is fed into at least one of the three

subunits.

6~~7~~. The energy supply system as set forth in claim 5~~6~~, wherein the third subunit ~~(42)~~ comprises a Fischer-Tropsch synthesis step and/or a liquid-phase methanol synthesis step.

7~~8~~. The energy supply system as set forth in ~~any one of~~ claim~~s~~ 5~~6 or 7~~;, wherein the utilization system ~~(37) is set up for the purpose of feeding~~feeds residual gas ~~(58)~~ from the second energy supply network ~~(6)~~ into at least one of the three subunits ~~(38, 40, 42)~~.

8~~9~~. The energy supply system as set forth in ~~any one of the preceding~~ claim~~s~~ 1, wherein the at least one energy-generating unit ~~(8)~~ comprises a system ~~(68, 69)~~ for producing electric current ~~(45, 46)~~.

9~~10~~. The energy supply system as set forth in claim 8~~9~~, wherein the system ~~(68)~~ for producing electric current ~~(45, 46) has~~includes a steam turbine operated by process steam.

10~~11~~. The energy supply system as set forth in claim 8~~9 or 10~~, wherein the system ~~(69)~~ for producing electric current ~~(45, 46) has~~includes a gas turbine operated with fluid operating materials ~~(56)~~ or a combined gas/steam turbine.

11~~12~~. The energy supply system as set forth in ~~any one of~~ claim~~s~~ 8~~9 to 11~~, wherein at least one energy-generating unit ~~(8)~~ is provided for ~~the purpose of~~ feeding the electric current produced into the first energy supply network ~~(4)~~.

12~~13~~. The energy supply system as set forth in claim 11~~12~~, wherein the control unit ~~(9) is set up for the purpose of communicating~~communicates via a communication network ~~(16)~~ with control units ~~(9')~~ of other energy supply systems ~~(2')~~ and/or with external power stations ~~(14, 14", 15)~~ and/or with control systems of power networks ~~(34)~~ of higher hierarchy levels.

13~~14~~. The energy supply system as set forth in claim 12~~3~~, wherein the control system ~~(70)~~ of the at least one energy management unit ~~(10) is set up for the purpose of communicating~~communicates via a communication network ~~(16)~~ with local energy consumers ~~(26)~~ and local energy producers ~~(28)~~ of the local energy supply network ~~(29)~~.

14~~15~~. The energy supply system as set forth in ~~any one of~~ claim~~s~~ 11~~12 to 14~~, wherein the at least one energy management unit ~~(10) has~~includes devices for heating heat media ~~(88)~~ and/or chilling cold media ~~(89)~~, the energy required for ~~this being~~the heating and/or chilling drawn from the power network ~~(4, 36)~~ of the energy supply system ~~(2)~~ and/or obtained through the energetic utilization of the fluid operating materials ~~(56)~~ obtained from the operating material transport system ~~(6, 60)~~ of the energy supply system, and devices for feeding the heated heat media ~~(88)~~ and/or chilled cold media ~~(89)~~ into corresponding heat transport systems ~~(92)~~ or cold transport systems ~~(94)~~ of the local energy supply network ~~(29)~~.

15~~16~~. The energy supply system as set forth in ~~any one of~~ claim~~s~~ 11~~2 to 15~~, wherein control unit ~~(9)~~ of an energy supply system ~~(2) is set up for the purpose of controlling and coordinating~~controls and coordinates the at least one energy-generating unit ~~(8)~~ and the at least one energy management unit ~~(10) in such a way~~so that the maximum transport rates into the two energy supply networks ~~(4, 6)~~ are lower than without control.

16~~17~~. An energy management unit ~~(10)~~ for supplying a local energy supply network ~~(29)~~, comprising:~~with~~ devices for extracting electric current ~~(46)~~ from a higher-level power network ~~(4, 36)~~ of an energy supply system ~~(2)~~, converting it into lower-voltage electric current ~~(47)~~, and feeding this lower-voltage electric current into a power network ~~(90)~~ of the local energy supply network; and devices for extracting the fluid operating materials ~~(56)~~ from a transport system ~~(6, 60)~~ for fluid operating materials of the energy supply system ~~(2)~~, for generating electric current ~~(47)~~ from said fluid operating materials ~~(56)~~, and for feeding the electric current into said power network of the local energy supply network; characterized by a control system ~~(70)~~ that is set up for the purpose of communicating via a communication network ~~(16)~~ with a control unit ~~(9)~~ of the energy supply system ~~(2)~~, and controlling the delivery rates of electric current ~~(46)~~ from the higher-level power network ~~(4, 36)~~ and of fluid operating materials ~~(56)~~ from the operating material transport system ~~(6, 60)~~ such that a maximally uniform loading of the corresponding supply networks ~~(36, 60)~~ over time is achieved, and/or a minimally small dimensioning of the second energy supply network ~~(6, 60)~~ is achieved in relation to the conductor cross section and/or the operating pressure.

17~~18~~. The energy management unit as set forth in claim 16~~7~~, wherein the control system ~~(70) is set up for the purpose of communicating~~communicates via a communication network ~~(16)~~ with local energy consumers ~~(26)~~ and local energy producers ~~(28)~~ of the local energy supply

network ~~(29)~~.

18~~19~~. The energy management unit as set forth in claim 1~~6~~7 ~~or 18~~, wherein the control system ~~(70) is set up for the purpose of controlling~~controls the energy management unit ~~(10) in such a way that it~~to draw~~s~~ substantially only the base load of the power requirement of the local energy supply network ~~(29)~~ from the higher-level power network ~~(4, 36)~~, whereas the peak load of the power requirement of the local energy supply network ~~(29)~~ is covered by the energetic utilization of fluid operating materials.

19~~20~~. The energy management unit as set forth in ~~any one of~~ claim~~s~~ 1~~6~~7 ~~to 19~~, wherein the control system ~~(70) is set up for the purpose of controlling~~controls the energy management unit ~~(10) in such a way~~so that the delivery rate of fluid operating materials ~~(56)~~ from the operating material transport system ~~(6, 60)~~ is substantially constant over time.

20~~21~~. The energy management unit as set forth in ~~any one of~~ claim~~s~~ 1~~6~~7 ~~to 20~~, further comprising~~with~~ devices for collecting residual gases ~~(58)~~ occurring in the energy management unit ~~(10)~~ during the energetic utilization of the fluid operating materials ~~(56)~~ and for returning these residual gases to a residual gas transport system ~~(6, 62)~~ of the energy supply system ~~(2)~~.

21~~2~~. The energy management unit as set forth in ~~any one of~~ claim~~s~~ 1~~6~~7 ~~to 21~~, further comprising~~with~~ devices for heating heat media ~~(88)~~ and/or chilling cold media ~~(89)~~, the energy required for ~~this being~~the heating and/or chilling drawn from the power network ~~(4)~~ of the energy supply system ~~(2)~~ and/or obtained through the energetic utilization of the fluid operating materials ~~(56)~~ obtained from the operating material transport system ~~(6, 60)~~ of the energy supply system, and a device for feeding the heated heat media ~~(88)~~ and/or chilled cold media ~~(89)~~ into corresponding heat transport systems ~~(92)~~ or cold transport systems ~~(94)~~ of the local energy supply network ~~(29)~~.

22~~3~~. An energy management unit ~~(10)~~ for supplying a local energy supply network ~~(29)~~, comprising:~~with~~ devices for extracting electric current ~~(46)~~ from a higher-level power network ~~(4, 36)~~ of an energy supply system ~~(2)~~, converting it into lower-voltage electric current ~~(47)~~, and feeding this lower-voltage electric current into a power network ~~(90)~~ of the local energy supply network; and devices for extracting the fluid operating materials ~~(56)~~ from the transport system ~~(6, 60)~~ for fluid operating materials of the energy supply system ~~(2)~~, for generating electric

current ~~(47)~~ from said fluid operating materials ~~(56)~~, and for feeding the electric current into said power network of the local energy supply network; characterized by a control system ~~(70)~~ that is set up for the purpose of communicating via a communication network ~~(16)~~ with a control unit ~~(9)~~ of the energy supply system ~~(2)~~, and by devices for collecting residual gases ~~(58)~~ occurring during the energetic utilization of the fluid operating materials ~~(56)~~ in the energy management unit ~~(10)~~, and for returning these residual gases to a residual gas transport system ~~(6, 62)~~ of the energy supply system ~~(2)~~.

2~~3~~4. The energy management unit as set forth in claim 2~~2~~3, wherein the control system ~~(70) is set up for the purpose of~~ alternately ~~extracting~~ extracts fluid operating materials ~~(56)~~ from a transport system for fluid operating materials ~~(56)~~ and residual gases ~~(58)~~ of the energy supply system ~~(2)~~ designed as a common line system, and ~~feeding~~ feeds residual gases into this common line system.

2~~4~~5. A method for supplying one or more local energy supply systems ~~(30)~~ with electrical energy ~~(47~~), comprising:~~wherein~~

~~-~~ drawing electrical energy ~~(45) is drawn~~ from a higher-level power network ~~(34)~~ and feeding~~fed (46)~~ into a first energy supply network ~~(4)~~;

~~-~~ producing fluid operating materials ~~(56) are produced~~ using at least one energy-generating unit ~~(8)~~, ~~are~~ optionally temporarily ~~stored (64)~~storing the fluid operating materials, and feeding the fluid operating materials~~fed~~ into a second energy supply network ~~(6)~~, the energy required for the production of the fluid operating materials being drawn from the higher-level power network ~~(34)~~ and, optionally, additionally obtained from energy-containing, carbon-containing source materials ~~(50)~~;

- drawing electrical energy ~~(46) is drawn~~ from the first energy supply network ~~(4)~~ using at least one energy management unit ~~(10)~~ and feeding~~fed~~ into the local power network ~~(90)~~;

- obtaining energy in the form of fluid operating materials ~~(56) is obtained~~ from the second energy supply network ~~(6)~~ using the at least one energy management unit ~~(10)~~, ~~is~~ optionally temporarily~~y~~ storing~~ed (64')~~ the fluid operating materials, and producing electrical energy ~~(47)~~ for the local energy supply system ~~(30) is produced~~ through the energetic utilization of the fluid operating materials and feeding~~fed~~ the electrical energy into the local power network ~~(90)~~; and

~~-~~ producing~~the production of~~ fluid operating materials ~~(56)~~ by means of the at least one energy-generating unit ~~(8)~~ as well as ~~the~~ obtaining of the two different forms of energy in the form of electrical energy ~~(46)~~ and fluid operating materials ~~(56)~~ from the first energy supply

network and from the second energy supply network is controlled and coordinated by the at least one energy management unit such that the maximum transport rates into the two energy supply networks ~~(4, 6)~~ are lesser than without control.