

TITLE: METHOD FOR PRODUCING ELECTRICITY BY MEANS OF AN INSTALLATION INTENDED TO BE PLACED IN A BODY OF WATER

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[0001] The present invention relates to a method for producing electricity by means of an installation intended to be placed in a body of water.

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[0002] In particular, the installation is able to receive liquefied natural gas (usually referred to by the acronym “LNG”) and to produce electrical energy from this liquefied natural gas, once the latter has been regasified.

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[0003] This natural gas is produced from a reservoir located below a body of water, or on land, and then liquefied and conveyed to the installation.

[0004] Several methods are known for producing electricity from liquefied natural gas.

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[0005] Conventionally, a terminal for receiving liquefied natural gas is installed at a receiving pier. LNG carriers deliver the liquefied natural gas which is stored in storage tanks and then regasified. Some of the gas produced is then used by a gas-fired power plant in order to produce electricity which is distributed over the electricity network.

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[0006] It is also known to use a floating storage and regasification unit (referred to by the acronym “FSRU”) which receives liquefied natural gas from an LNG carrier. The liquefied natural gas is then temporarily stored on the FSRU and subsequently returned to a gaseous form before being sent to an onshore gas-fired power plant.

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[0007] Alternatively, the gas produced by the FSRU is sent to a floating barge receiving the gas and then producing electrical energy. Such a solution allows flexible and mobile electricity production compared with an onshore power

plant. Thus, such a solution makes it possible to electrify an area quickly and with a reduced investment.

5 [0008] However, the FSRUs are new ships or former LNG carriers converted into FSRUs. The cost of the FSRUs represents a very large proportion of the cost of such electricity production projects. By way of example, the cost of a newly built FSRU is often in excess of 200 million euros. As for the use of former LNG carriers, it makes it possible to achieve a certain saving but the cost of converting them into FSRUs is still in the order of 100 million euros
10 because significant modifications to the LNG carriers are necessary.

[0009] It is also known to use a fully integrated floating storage, regasification and power generation barge (referred to by the acronym "FSRP"). This fully integrated design makes it possible to combine the storage and regasification
15 functions with the electricity production function on a single floating object, thus offering operational flexibility and rapid deployment. However, the complexity and the cost of the design and construction of such a structure are detrimental to their competitiveness.

20 [0010] One aim of the invention is therefore to provide a method for producing electricity which has a reduced design and installation cost while maintaining the flexibility of the storage of liquefied natural gas and of the production of electricity on water.

25 [0011] To this end, the invention relates to a method for producing electricity by means of an installation intended to be placed in a body of water, the installation comprising:

- a floating storage unit, the storage unit comprising an internal volume having a main tank for storing liquefied natural gas;
- 30 - a floating regasification and electricity production unit, separated from the storage unit, the regasification and electricity production unit comprising a regasification module and an electricity production module;

- a unit for transferring liquefied natural gas between the storage unit and the regasification and electricity production unit;
 - the production method comprising at least the following steps:
 - transferring liquefied natural gas from the main tank of the storage unit to the regasification and electricity production unit via the transfer unit;
 - regasifying the liquefied natural gas into gas in the gaseous state by means of the regasification module;
 - transferring the gas from the regasification module to the electricity production module;
- 10 - producing electricity from the gas by means of the electricity production module.

[0012] The method for producing electricity according to the invention may comprise one or more of the following features, considered alone or in any technically possible combination:

- 15 - the method further comprises a step of transferring the liquefied natural gas from an LNG carrier to the main tank of the storage unit;
- the transfer unit directly feeds the regasification module with liquefied natural gas, advantageously at a flow rate of between 10 m³/h and 500 m³/h;
- the regasification and electricity production unit further comprises a buffer tank having a capacity which is less than the main tank, the transfer unit transferring the liquefied natural gas to the buffer tank, advantageously at a flow rate of between 500 m³/h and 3000 m³/h, the liquefied natural gas then being transferred from the buffer tank to the regasification module;
- 20 - the storage unit and the regasification unit are moored to a common pier connected to a dock on land;
- 25 - the storage unit and the regasification and electricity production unit are arranged along the pier, on either side of the pier;
- the storage unit is moored to at least one floating buoy which is anchored to the bottom of the body of water, the regasification and electricity production unit being moored along the storage unit;
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- the storage unit is moored by at least one anchoring line which is anchored to the bottom of the body of water, the regasification and electricity production unit being moored along the storage unit;
- the transfer unit comprises ducts which are arranged on the pier in order to transfer the liquefied natural gas from the storage unit to the regasification and electricity production unit;
- the transfer unit comprises ducts which directly connect the storage unit and the regasification and electricity production unit in order to directly transfer the liquefied natural gas from the storage unit to the regasification and electricity production unit;
- the ducts are articulated rigid pipes and/or cryogenic flexible pipes;
- the electricity production module comprises an electrical production means selected from the group consisting of:
 - a gas engine,
 - a gas-and-diesel or gas-and-fuel-oil dual-fuel engine,
 - an open-cycle gas turbine,
 - a gas-and-diesel or gas-and-fuel-oil, open-cycle, dual-fuel turbine,
 - combined-cycle gas turbine and steam turbine,
 - combined-cycle dual-fuel, gas-and-diesel or gas-and-fuel-oil, and steam turbines;
- the electricity production module is combined-cycle turbines, the regasification and electricity production unit comprising a first heat exchanger which is arranged between the regasification module for heating the liquefied natural gas and the electricity production module for condensing the steam at the outlet of the steam turbine of the combined cycle;
- the regasification and electricity production unit comprises a second heat exchanger which is arranged between the regasification module for heating the liquefied natural gas and the electricity production module for cooling the intake air in the engine or the gas turbine;
- the electricity production module is at least one combined-cycle gas turbine and steam turbine, the electrical production module comprising a condenser which takes water from the body of water in order to condense the steam at

the outlet of the steam turbine and at least one wet cooling tower which cools the water at the outlet of the condenser before its discharge into the body of water; and

- the regasification and electricity production unit comprises a system for measuring the liquefied natural gas circulating at the inlet of the regasification module and/or the gas circulating at the outlet of the regasification module.

[0013] The invention will be better understood upon reading the following description, given solely by way of example, and made with reference to the accompanying drawings, in which:

- Figure 1 is a top view of an installation according to the invention,
- Figure 2 is a top view of a variant of the installation of Figure 1,
- Figure 3 is a top view of another variant of the installation of Figure 1,
- Figure 4 is a top view of another variant of the installation of Figure 1,
- Figure 5 is a schematic representation of a regasification and electricity production unit of the installation of Figure 1,
- Figure 6 is a partial schematic representation of a variant of the regasification and electricity production unit of Figure 5, and
- Figure 7 is a partial schematic representation of another variant of the regasification and electricity production unit of Figure 5.

[0014] Hereinafter, "liquefied natural gas" is understood to mean natural gas from which the water, the heavy compounds (for example, C6+ compounds), and sulfur compounds have been partly extracted and which has then been condensed into a liquid state. The liquefied natural gas essentially consists of methane but also ethane, propane, and butane in particular. The methane becomes liquid at a temperature of -161°C at atmospheric pressure and takes the form of a clear, transparent, odorless, non-corrosive, and non-toxic liquid. In this form, the liquefied natural gas has a density of about six hundred times greater than the density of the gas under normal temperature and pressure conditions.

[0015] "Gas" is understood to mean the natural gas in the gaseous state, in particular after the regasification of the liquefied natural gas.

5 [0016] In the following, the terms "upstream" and "downstream" are understood relative to the normal direction of circulation of a flow in a duct.

[0017] An installation 10 is shown in Figures 1 to 4.

10 [0018] The installation 10 is intended to be placed on a body of water 12.

[0019] The body of water 12 is, for example, a lake, a sea, or an ocean. The depth of the body of water 12 directly below the installation 10 is, for example, between 5 m and 3000 m.

15 [0020] The installation 10 is configured to produce electricity and to feed an electrical network, an onshore infrastructure 14 such as a factory as illustrated in Figure 1, or alternatively a maritime infrastructure such as an oil platform.

20 [0021] The installation 10 here feeds the onshore infrastructure 14 via an electrical line 15.

25 [0022] The installation 10 comprises a storage unit 16, a regasification and electricity production unit 18, and a transfer unit 20 between the storage unit 16 and the regasification and electricity production unit 18.

[0023] As can be seen in Figures 1 and 2, the storage unit 16 and the regasification unit are moored to a common pier 22 connected to a dock 24 on land.

30 [0024] The pier 22 is a rigid built structure which projects into the body of water 12 from the dock 24 on land. The dock 24 on land is a roadway provided at the edge of the body of water 12, for example at a port.

[0025] In the example in Figure 1, the storage unit 16 and the regasification and electricity production unit 18 are arranged along the pier 22, on either side of the pier 22.

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[0026] In a variant, in the example in Figure 2, the storage unit 16 and the regasification and electricity production unit 18 are arranged along the pier 22, on the same side of the pier 22. The storage unit 16 and the regasification and electricity production unit 18 are then arranged in tandem, one behind the other.

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[0027] In another variant, as illustrated in Figure 3, the installation 10 is not moored to a pier 22. The storage unit 16 is moored to at least one floating buoy 26, in this case three floating buoys 26. Each floating buoy 26 is anchored to the bottom of the body of water 12. The regasification and electricity production unit 18 is moored along the storage unit 16.

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[0028] In another variant, as illustrated in Figure 4, the storage unit 16 is moored by means of at least one anchoring line 27 anchored directly to the bottom of the body of water 12, in this case three anchoring lines 27. The regasification and electricity production unit 18 is moored along the storage unit 16.

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[0029] The storage unit 16 and the regasification and electricity production unit 18 are units floating on the body of water 12. They in particular have a floating hull on which a plurality of interconnected pieces of equipment are arranged.

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[0030] The storage unit 16 and the regasification and electricity production unit 18 are separated from each other. In other words, the storage unit 16 and the regasification and electricity production unit 18 each comprise their own floating hull and are able to move over the body of water 12 independently of each other when they are not moored to each other.

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[0031] The storage unit 16 comprises a floating hull 17 defining an internal volume which itself comprises at least one liquefied natural gas storage tank 28.

5 [0032] In the embodiment shown in the Figures, three tanks 29a, 29b, and 29c are fluidically connected to one another.

[0033] As can be seen in Figure 1, the main tank 28 is able to be fed with liquefied natural gas by an LNG carrier 31 (also referred to as a liquefied natural gas or LNG tanker) sailing over the body of water 12 and mooring along
10 the storage unit 16.

[0034] The main tank 28 is able to store a quantity of liquefied natural gas of between 5000 m³ and 300,000 m³.

15 [0035] The regasification and electricity production unit 18 comprises a regasification module 30 and an electricity production module 32.

[0036] The exemplary installation 10 of Figure 1 lacks a liquefied natural gas storage tank, the liquefied natural gas being transferred directly from the main
20 tank 28 of the storage unit 16 to the regasification module 30.

[0037] In the variant shown in Figure 2, the regasification and electricity production unit 18 further comprises a buffer tank 33 able to store liquefied natural gas.
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[0038] The buffer tank 33 has a storage capacity which is less than that of the main tank 28.

[0039] In particular, the buffer tank 33 is able to store a quantity of liquefied
30 natural gas of between 500 m³ and 30,000 m³.

[0040] The regasification module 30 is configured so as to transform the liquefied natural gas into a gaseous state in order to obtain gas again.

5 [0041] The regasification module 30 comprises evaporators configured so as to boil the liquefied natural gas either by heat exchange with the ambient air and/or with the water coming from the body of water 12, or by the combustion of a fraction of the liquefied natural gas making it possible to supply the heat required for the evaporation thereof.

10 [0042] The regasification module 30 is configured so as to transmit the gas thus produced to the electricity production module 32.

[0043] The floating regasification and electricity production unit 18 advantageously further comprises a system for measuring the liquefied natural
15 gas circulating at the inlet of the regasification module 30 and/or the gas circulating at the outlet of the regasification module 30.

[0044] The electricity production module 32 is configured so as to produce electricity from the gas supplied. In particular, the electricity production module 32
20 is configured so as to produce electrical power of between 15 MW and 1500 MW.

[0045] The electricity production module 32 comprises an electrical production means selected from the group consisting of:

- a gas engine,
- 25 - a gas-and-diesel or gas-and-fuel-oil dual-fuel engine,
- an open-cycle gas turbine,
- a gas-and-diesel or gas-and-fuel-oil, open-cycle, dual-fuel turbine,
- a combined-cycle gas turbine and steam turbine,
- a combined-cycle dual-fuel, gas-and-diesel or gas-and-fuel-oil turbine, and a
30 steam turbine.

[0046] In particular, an example of a regasification and electricity production unit 18 comprising a combined cycle is shown in Figure 5.

5 [0047] The electricity production module 32 comprises an air compressor 34 configured so as to compress the incoming air, a combustion chamber 38 fed with compressed air and with gas by the regasification module 30, and a fed gas turbine 40 allowing the rotation of a first alternator 41 in order to produce electricity. The production module 32 may further have a plurality of compressors 34, combustion chambers 38, gas turbines 40, and alternators
10 41, connected to the other components of the production module 32.

[0048] The electricity production module 32 further comprises a steam-generating heat exchanger 42 arranged between the outlet of the gas turbine 34 and a closed cycle in which water, for example, circulates. The steam-generating heat exchanger 42 is configured so as to evaporate the water
15 before it enters a steam turbine 44. The steam turbine 44 allows the rotation of a second alternator 46 in order to also produce electricity.

[0049] The steam at the outlet is sent to a condenser 48 configured so as to
20 condense the steam into liquid water. The condenser 48 is fed with water taken from the body of water 12. A pump 49 is configured so as to circulate the water in the closed cycle.

[0050] As can be seen in Figure 5, the regasification and electricity production
25 unit 18 then advantageously comprises a first heat exchanger 50 arranged between the regasification module 30 for heating the liquefied natural gas and the electricity production module 32 for condensing the steam at the outlet of the steam turbine of the combined cycle.

30 [0051] The first exchanger 50 thus makes it possible to improve the overall efficiency of the installation 10 by using the regasification module 30 as a cold source in order to contribute to the condensation of the steam in the closed

cycle, thus reducing the quantity of water from the body of water 12 necessary for the condensation of all of the steam.

5 [0052] According to Figure 5, the exchanger 50 is inserted in series at the outlet of the condenser 48. However, other architectures can advantageously be used, in particular by using a bypass feeding the exchanger 50 with only some of the water circulating in the condenser 48. This architecture has the advantage of being able to adapt more easily to the different heat exchange needs, in particular during start-up phases or partial load operations when only
10 some of the gas turbines are operating.

[0053] Figure 6 shows the open cycle of an open-cycle gas turbine 44 or shows the open cycle of a combined cycle.

15 [0054] As can be seen in this Figure 6, the regasification and electricity production unit 18 advantageously comprises a second heat exchanger 52 which is arranged between the regasification module 30 for heating the liquefied natural gas and the electricity production module 32 for cooling the intake air in the gas turbine 40. Here, the second exchanger 52 is arranged
20 upstream of the compressor 34.

[0055] In a variant not shown, when the electrical production means is an engine, the second heat exchanger 52 arranged between the regasification module 30 for heating the liquefied natural gas and the electricity production
25 module 32 for cooling the intake air into the engine.

[0056] Advantageously, the second exchanger 52 comprises a secondary circuit in which an intermediate fluid circulates in order to avoid the risks of gas leaking at the inlet of the gas turbine 40 or of the engine in the event of a
30 malfunction of the second exchanger 52.

[0057] The second exchanger 52 makes it possible to cool the intake air feeding the gas turbine 40 or the gas engine in order to improve their efficiency.

5 [0058] Figure 7 shows only the closed cycle of a combined cycle when the electricity production means comprises combined-cycle gas turbines 40 and steam turbines 44.

10 [0059] As can be seen in this Figure 7, the electrical production module 32 advantageously comprises at least one wet cooling tower 54 cooling the water at the outlet of the condenser 48 before its discharge into the body of water 12.

15 [0060] The cooling tower 54 is configured so as to cool the water exiting the condenser 48 by spraying this water in the tower which cools in the stream of ambient air which circulates in the tower and then to collect the water before discharging it into the body of water 12.

20 [0061] The cooling tower 54 allows the water to be discharged into the body of water 12 substantially at the same temperature as the water taken from the body of water and thus reduces the impact on the temperature of the body of water 12 and thus on the aquatic population in the body of water 12.

25 [0062] The transfer unit 20 is configured so as to transfer the liquefied natural gas between the storage unit 16 and the regasification and electricity production unit 18, in particular by means of at least one transfer pump arranged on the storage unit 16.

30 [0063] In the example of Figure 1, the transfer unit 20 is configured so as to directly feed the regasification module 30 with liquefied natural gas, advantageously at a flow rate of between 10 m³/h and 500 m³/h.

[0064] In the variant of Figure 2, when the regasification and electricity production unit 18 comprises a buffer tank 33, the transfer unit 20 is configured

so as to transfer the liquefied natural gas to the buffer tank 33, advantageously at a flow rate of between 500 m³/h and 3000 m³/h. This allows the use of standard transfer pumps and does not require the installation of low flow rate pumps operating continuously.

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[0065] As can be seen in Figure 1, the transfer unit 20 comprises ducts which are arranged on the pier 22 in order to transfer the liquefied natural gas from the storage unit 16 to the regasification and electricity production unit 18.

10 [0066] Advantageously, the ducts are articulated rigid pipes.

[0067] Alternatively, the ducts are cryogenic flexible pipes.

15 [0068] A significant accumulation of ice can develop around the transfer unit 20 during the transfer of the liquefied natural gas. Thus, the rigid articulated pipes are preferred to the flexible pipes which tend to remain rigid in the presence of a layer of ice.

[0069] Advantageously, each pipe is replicated for the sake of operational safety.

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[0070] In the variant of Figure 2, the transfer unit 20 comprises ducts directly connecting the storage unit 16 and the regasification and electricity production unit 18. "Directly" is understood to mean that the ducts do not lie on the pier 22 or another intermediate support between the two units 16, 18.

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[0071] Advantageously, the transfer unit 20 is configured so as to transfer the gas present in the regasification module 30 or in the buffer tank 33 back to the storage unit 16 to compensate for the volume of liquid transferred from the main tank to the regasification module 30 or respectively the buffer tank 33.

30 This transfer of gas is advantageously performed in parallel with the transfer of liquefied natural gas by means of at least one independent dedicated duct.

[0072] A method for producing electricity by means of the installation 10 will now be described.

5 [0073] Initially, the storage unit 16 and the regasification and electricity production unit 18 float on the body of water 12 and are moored to the pier 22 as can be seen in Figures 1 and 2 and/or to at least one floating buoy 26, as can be seen in Figure 3, and/or to at least one anchoring line 27, as can be seen in Figure 4.

10 [0074] An LNG carrier 26 draws alongside and then moors at the storage unit 16.

[0075] The LNG carrier 26 then transfers liquefied natural gas to the main tank 28 of the storage unit 16.

15 [0076] The storage unit 16 thus stores a large quantity of liquefied natural gas, in particular a quantity of liquefied natural gas of between 5000 m³ and 300,000 m³.

20 [0077] The method then comprises a step of transferring liquefied natural gas from the main tank 28 of the storage unit 16 to the regasification and electricity production unit 18 via the transfer unit 20.

25 [0078] In the example of Figure 1, the transfer unit 20 directly feeds the regasification module 30 with liquefied natural gas, advantageously at a flow rate of between 10 m³/h and 500 m³/h.

[0079] Thus, in this example, the transfer unit 20 continuously feeds the regasification module 30 with liquefied natural gas as long as it is necessary to produce electricity.

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[0080] In the variant of Figure 2, the transfer unit 20 transfers the liquefied natural gas to the buffer tank 33, advantageously at a flow rate of between 500

m³/h and 3000 m³/h, In particular, the transfer unit 20 transfers the liquefied natural gas to the buffer tank 33 until the buffer tank 33 is full. When the capacity of the buffer tank 33 is again less than a threshold value, the transfer unit 20 then transfers the liquefied natural gas to the buffer tank 33. Thus, the transfer unit 20 transfers the liquefied natural gas periodically to ensure that there is a sufficient quantity of liquefied natural gas in the buffer tank 33.

[0081] The liquefied natural gas is then transferred from the buffer tank 33 to the regasification module 30 when it is necessary to produce electricity.

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[0082] The method then comprises a step of regasifying the liquefied natural gas into gas in the gaseous state by means of the regasification module 30.

[0083] In particular, the liquefied natural gas circulates in the evaporators which allow the regasification in order to obtain gas again in the gaseous state.

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[0084] The gas is then transferred from the regasification module 30 to the electricity production module 32.

[0085] The method then comprises a step of producing electricity from the gas by means of the electricity production module 32.

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[0086] In particular, the gas is used as fuel in a gas engine or a gas turbine 40.

[0087] In the example of Figure 5, the gas is injected into the combustion chamber 38 in order to feed the gas turbine 40. The rotation of the gas turbine 40 drives the first alternator 41, which then produces electricity.

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[0088] When the electrical production means is a combined cycle as shown in Figure 5, the steam-generating heat exchanger 42 arranged between the outlet of the gas turbine 34 and the closed cycle makes it possible to evaporate

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the water before it enters the steam turbine 44. The steam turbine 44 drives the second alternator 46, which then also produces electricity.

5 [0089] The electricity produced is then sent to feed an electrical network, an onshore infrastructure 14, or alternatively a maritime infrastructure via the electrical line 15.

[0090] It can then be seen that the invention has a certain number of advantages.

10 [0091] The invention has the same flexibility of the storage of liquefied natural gas and of the production of electricity on water as the solutions of the prior art. Indeed, it is possible to easily move the installation 10 over the body of water 12 and thus quickly supply electricity to an infrastructure or a network requiring this electricity through the production method according to the invention.
15 Furthermore, the structural and environmental impact on the coast is limited.

[0092] In addition, the method according to the invention makes it possible to produce electricity from natural gas in a much less expensive way than by means of the architectures of the prior art. By way of example, savings of about
20 20% are possible relative to a fully integrated FSRP architecture or an FSRU architecture with a motorized floating barge.

[0093] Indeed, in the present invention, existing and converted LNG carriers can be used to serve as a storage unit 16 with few modifications and at a very
25 competitive cost.

[0094] In comparison with an FSRU architecture combined with a motorized floating barge where it is necessary to manage the construction or conversion of an FSRU as well as the construction of the motorized barge, the present
30 invention makes it possible to have a single project to manage, namely the construction of the regasification and electricity production unit 18.

[0095] Furthermore, the absence of significant storage of liquefied natural gas on the regasification and electricity production unit 18 makes it possible to avoid the use of ballast and makes it possible to use a hull with a shallow draft, similar to a simple flat barge and thus significantly reduce the costs of construction of such a unit.

[0096] In addition, the absence of significant storage of liquefied natural gas on the regasification unit also makes it possible to considerably facilitate the construction of the regasification and electricity production unit 18, since no experience of storing liquefied natural gas is required for the shipyard selected for the construction. Therefore, a large number of competing shipyards can be envisaged for the construction of several of these units 18.

[0097] Finally, the possibility of using the thermal integration between the regasification module 30 and the electricity production module 32 to increase the overall efficiency of the installation also contributes to the overall competitiveness and to reducing the environmental impact of the installation 10. This thermal optimization is not possible with an FSRU architecture combined with a motorized barge and entails much higher costs with a fully integrated FSRP unit.

CLAIMS

1. A method for producing electricity by means of an installation (10) placed on a body of water (12), the installation (10) comprising:
 - 5 - a floating storage unit (16), the storage unit (16) comprising a hull (17) defining an internal volume comprising a main tank (28) for storing liquefied natural gas;
 - a floating regasification and electricity production unit (18), separated from the storage unit (16), the regasification and electricity production unit (18)
10 comprising a regasification module (30) and an electricity production module (32);
 - a unit (20) for transferring liquefied natural gas between the storage unit (16) and the regasification and electricity production unit (18);the production method comprising at least the following steps:
 - transferring liquefied natural gas from the main tank (28) of the
15 storage unit (16) to the regasification and electricity production unit (18) via the transfer unit (20);
 - regasifying the liquefied natural gas into gas in the gaseous state by means of the regasification module (30);
 - transferring the gas from the regasification module (30) to the
20 electricity production module (32);
 - producing electricity from the gas by means of the electricity production module (32).
2. The electricity production method according to claim 1, further
25 comprising a step of transferring liquefied natural gas from an LNG carrier (31) to the main tank (28) of the storage unit (16).
3. The electricity production method according to claim 1 or 2, wherein the transfer unit (20) directly feeds the regasification module (30) with liquefied
30 natural gas, advantageously at a flow rate of between 10 m³/h and 500 m³/h.

4. The electricity production method according to claim 1 or 2, wherein the regasification and electricity production unit (18) further comprises a buffer tank (33) having a capacity which is less than the main tank (28),
the transfer unit (20) transferring the liquefied natural gas to the buffer
5 tank (33), advantageously at a flow rate of between 500 m³/h and 3000 m³/h,
the liquefied natural gas is then transferred from the buffer tank (33) to
the regasification module (30).
5. The electricity production method according to any one of the preceding
10 claims, wherein the storage unit (16) and the regasification unit (18) are
moored to a common pier (22) which is connected to an earthen dock (24).
6. The electricity production method according to claim 5, wherein the
storage unit (16) and the regasification and electricity production unit (18) are
15 arranged along the pier (22), on either side of the pier (22).
7. The electricity production method according to claim 5, wherein the
storage unit (16) and the regasification and electricity production unit (18) are
20 arranged along the pier (22), on the same side of the pier (22).
8. The electricity production method according to any one of claims 1 to 4,
wherein the storage unit (16) is moored to at least one floating buoy (26) which
is anchored to the bottom of the body of water (12), the regasification and
electricity production unit (18) being moored along the storage unit (16).
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9. The electricity production method according to any one of claims 1 to 4,
wherein the storage unit (16) is moored by at least one anchoring line (27)
which is anchored to the bottom of the body of water (12), the regasification
and electricity production unit (18) being moored along the storage unit (16).
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10. The electricity production method according to any one of claims 5 to 7,
wherein the transfer unit (20) comprises ducts which are arranged on the pier

(22) in order to transfer the liquefied natural gas from the storage unit (16) to the regasification and electricity production unit (18).

11. The electricity production method according to any one of claims 1 to 8,
5 wherein the transfer unit (20) comprises ducts which directly connect the storage unit (16) and the regasification and electricity production unit (18) in order to directly transfer the liquefied natural gas from the storage unit (16) to the regasification and electricity production unit (18).

10 12. The electricity production method according to claim 10 or 11, wherein the ducts are articulated rigid pipes and/or cryogenic flexible pipes.

13. The electricity production method according to any one of the preceding claims, wherein the electricity production module (32) comprises an electrical
15 production means selected from the group consisting of:

- a gas engine,
- a gas-and-diesel or gas-and-fuel-oil dual-fuel engine,
- an open-cycle gas turbine (40),
- a gas-and-diesel or gas-and-fuel-oil, open-cycle, dual-fuel turbine,
- 20 - combined-cycle gas turbine (40) and steam turbine (44),
- combined-cycle dual-fuel, gas-and-diesel or gas-and-fuel-oil, and steam turbines (44).

14. The electricity production method according to claim 13, wherein the
25 electricity production module (32) is combined-cycle turbines, the regasification and electricity production unit (18) comprising a first heat exchanger (50) which is arranged between the regasification module (30) for heating the liquefied natural gas and the electricity production module (32) for condensing the steam at the outlet of the steam turbine (44) of the combined cycle.

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15. The electricity production method according to claim 13 or 14, wherein the regasification and electricity production unit (32) comprises a second heat

exchanger (52) which is arranged between the regasification module (30) for heating the liquefied natural gas and the electricity production module (32) for cooling the intake air in the engine or gas turbine (44).

5 16. The electricity production method according to any one of claims 13 to
15, wherein the electricity production module (32) is at least one combined-
cycle gas turbine (40) and steam turbine (44), the electrical production module
(32) comprising a condenser (48) which samples water from the body of water
(12) in order to condense the steam at the outlet of the steam turbine (44) and
10 at least one wet cooling tower (54) which cools the water at the outlet of the
condenser (48) before its discharge into the body of water (12).

17. The electricity production method according to any one of the preceding
claims, wherein the regasification and electricity production unit (18) comprises
15 a system for measuring the liquefied natural gas circulating at the inlet of the
regasification module (30) and/or the gas circulating at the outlet of the
regasification module (30).