FURMAN IP
LAW & STRATEGY

CORY J. FURMAN
(306) 992-5832
cfurman@furmanip.com

Assistant:
Lorna Giljam
(306) 992-5834
lgiljam@furmanip.com

June 27, 2017

ATTN: PCT RECEIVING OFFICE
Commissioner of Patents
Canadian Intellectual Property Office
Place du Portage I
50 Victoria Street
Ottawa- Hull, Canada
K1A 0C9

Dear Sirs:

RE: New PCT Application – RO/CA
Title: RENEWABLE ENERGY SYSTEM
Applicant: Marvin Milos
Our File: 869-004

In your capacity as Canadian receiving office please accept the enclosed PCT application for filing. The following documents are enclosed:

a) PCT Request
b) Fee Payment Sheet; and
c) Specification and figures.

We wish to defer the payment of the fees in this case, as outlined in the PCT rules.

Fees and General payment authorization:

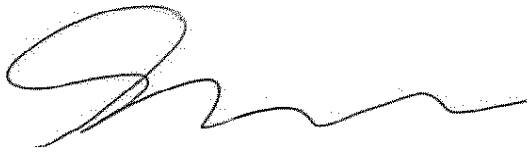
As indicated above we wish to defer the payment of the fees in this case as outlined in the rules. That being said, if any fees cannot be deferred and require to be paid in respect to this filing or the requests outlined herein, you are authorized to charge those to our credit card outlined on the enclosed CIPO payment form.

FURMAN IP
LAW & STRATEGY

Thank you in advance for your assistance in this regard.

Yours very truly,

FURMAN IP LAW & STRATEGY PC



Cory J. Furman

CJF/
Encl.

Abstract

A system for using electrical energy generated by renewable sources is used to hydrolyse water into hydrogen and oxygen. The hydrogen and oxygen can be used on-site for the generation of electrical power, or stored in liquid form for later use. Exhaust from a power generator can provide a system for purifying water from non-potable sources, and as an input stream for the electrolysis system. Also described is a self-contained fueling station that can provided purified hydrogen for vehicles running on such a fuel.

RENEWABLE ENERGY SYSTEM

Milos

Field of the Invention:

The invention is in the field of apparatus and methods for the use of renewable energy sources to generate electrical power.

Background:

More than 20 TWh of electrical energy are generated worldwide each year. Of this, only about 10-15% is generated from renewable sources of energy such as wind and solar power. The majority of electrical energy is produced by the combustion of non-renewable sources such as coal, oil and natural gas.

Combustion-based power generation results in significant emissions. For example, in 2015, emissions of CO_2 in the United States alone amounted to 1.925 million metric tons, or about 37% of the total US energy-related emissions. The result of this is a significant production of greenhouse gases that when released into the atmosphere contribute to global climate change.

There has been progress in using renewable energy sources such as wind or solar energy to augment or replace non-renewable sources used for electrical power generation. For example, U.S. Patent No. 7,964,981 discloses a solar and wind energy converter that converts solar and wind energy into mechanical energy for driving an electrical generator. Similarly, U.S. Patent No. 8,330,296 discloses a turbine system that uses wind and solar energy to either drive a generator or generate power directly from a photovoltaic system.

There are countless other patent disclosures that describe various means of turning mechanical (wind or sea currents) or solar energy into electrical power. Mechanical sources are typically used to directly drive electrical generation systems, while solar systems typically convert light into electricity via a variety of photovoltaic cells.

A limitation of all these systems is that they provide no means of storing energy for later use, but rather simply load electrical energy onto an energy distribution grid in real time. Thus, a significant limitation is that there will be periods where production capacity exceeds demands, and similarly, times when demand outstrips production. When production exceeds demands, generation capacity is effectively wasted. When demand exceeds production, consumers of electricity must acquire their power from other sources, such as power plants fueled by non-renewable resources.

What is therefore needed is a system in which excess electrical energy can be converted into a storage form that can later be used to drive an electrical generation system for use when the initial source of energy (e.g., wind, light) is not available in sufficient quantities to meet electrical demand.

Summary of the Invention:

Only a fraction of the world electrical needs is currently met through renewable energy sources hydroelectric, or solar power. As a result, most electrical power is generated from non-renewable sources, typically fossil fuels. While fossil fuels currently enjoy an economic advantage over other forms of energy production, there are nonetheless considered to be a finite resource. In addition, fossil fuels create issues with respect to environmental contamination both during extraction, processing, transportation and use.

Accordingly, there is a desire to develop and make use of electrical generating systems that avoid the use of non-renewable resources where possible. Typically, the primary focus in developing electrical generation systems that use renewable sources of energy have been in the areas of hydroelectric, wind and solar power. Each of these has limitations due the nature of the processes involved. For example, hydroelectric power typically requires large rivers, dam systems and significant capital investment to be economically viable. In addition, restricting river courses to build hydroelectric facilities comes at environmental cost in lost land area due to flooding of reservoirs, displacement

of wildlife and people and release of toxic chemicals from naturally occurring ground sources into water contained in the reservoir.

For wind and solar power, the challenges are somewhat different. Primarily, the drawback to generating power using wind or solar energy is that power production only occurs when either the wind is blowing or the sun is shining, and these times may not match those periods of maximum demands by consumers of electrical energy. When power production exceeds demand, potential energy is effectively wasted, and when demand outstrips production, consumers must turn to other sources of energy, such as non-renewable resources, to supply the missing electrical capacity.

In some embodiments, the present disclosure describes a system in which water is collected and purified by a combination of filtration and/or distillation to produce essentially pure water. Using electrical power from either wind turbines, photovoltaic arrays and the like, the water is electrolyzed into hydrogen and oxygen, which are captured, separated and stored in pressurized vessels. At a later point in time, the collected hydrogen and oxygen and combusted, for example in a hydrogen fuel cell to create electricity, or in a gas turbine, which drives an electrical generator.

In yet other embodiments, an unpurified source of water, such as seawater is used directly in a hydrolysis system to produce hydrogen and oxygen. In some cases, the hydrogen and oxygen can be fed directly to a fuel cell and burned to produce electricity. In other cases, the hydrogen and oxygen can be collected and stored for later use as a fuel source.

Still other embodiments of the invention include a self-contained facility in which a renewable energy source is used to electrolyze water into hydrogen and oxygen. The hydrogen and oxygen can be stored on site for use as fuel for other purposes such as for refueling vehicles that operate on hydrogen fuel cells. A portion of the hydrogen and oxygen and be fed to an on-site fuel cell to produce electrical power for the self-contained facility. This allows operation in remote areas that may not have access to an existing electrical grid. Conveniently, the exhaust from the on-site fuel cell system, water, can be fed back via a closed loop system to provide the starting material for the fuel cell.

Thus, in some embodiments, the invention comprises a system for converting energy from a renewable energy source into a storable form of energy, the system comprising: a source of electrical energy, wherein the electrical energy is generated by a source from a source of renewable energy; an input stream, the input stream comprising water, an electrolysis system, the electrolysis system configured to use the source of electrical energy to convert the water into hydrogen and oxygen, wherein the electrolysis system further comprises separate hydrogen and oxygen output streams; a hydrogen storage system; an oxygen storage system; a power generator, wherein the power generator is configured to use at least a portion of the hydrogen and oxygen generated by the electrolysis system to produce electrical power; a collector system, the collector system configured to collected exhaust created by the power generator, wherein the exhaust from the collector system can provide the input stream for the electrolysis system; wherein the

portion of hydrogen and oxygen not used by the power generator is available as a storable form of energy.

In some embodiments, the input stream is one of fresh water and sea water.

In some embodiments, the system further comprises a water treatment system, the water treatment system comprising at least one of a filtration system, a distillation system, and a deionizing system, the water treatment system configured to partially purify the input stream prior to introduction the input stream into the electrolysis system.

In some embodiments, the input stream comprises water recovered from the power generator.

In some embodiments, the system is configured to transmit electrical power to an electrical grid distribution system. In some embodiments, the system is configured to refuel vehicles that operate on hydrogen consuming fuel systems.

In some embodiments, there is also provided a method for converting energy from a renewable energy source into a storable form of energy, the method comprising: providing a source of electrical energy, wherein the electrical energy is generated by a source from a source of renewable energy; providing an input stream, the input stream comprising water, providing an electrolysis system, the electrolysis system configured to use the source of electrical energy to convert the water into hydrogen and oxygen, wherein the electrolysis system further comprises separate hydrogen and oxygen output

streams; introducing water into the electrolysis system; operating the electrolysis system such that water is converted into hydrogen and oxygen gas; providing a hydrogen storage system; providing an oxygen storage system; providing a power generator, wherein the power generator is configured to use at least a portion of the hydrogen and oxygen generated by the electrolysis system to produce electrical power; providing a collector system, the collector system configured to collected exhaust created by the power generator, wherein the exhaust from the collector system can provide the input stream for the electrolysis system; and storing the portion of the hydrogen and oxygen not used by the power generator.

In some embodiments of the method, the input stream is one of fresh water and sea water.

In some embodiments, the method further comprises providing a water treatment system, the water treatment system comprising at least one of a filtration system, a distillation system, and a deionizing system, the water treatment system configured to partially purify the input stream prior to introduction the input stream into the electrolysis system, and processing the input stream with the water treatment system prior to introducing the input stream into the electrolysis system.

In some embodiments, the method further comprises using water recovered from the power generator as at least a portion of the input stream.

In some embodiments, the method further comprises transmitting electrical power to an electrical grid distribution system.

In some embodiments, the method further comprises using hydrogen generated by the electrolysis system to refuel vehicles that operate on hydrogen consuming fuel systems.

Brief Description of the Drawings:

While the invention is claimed in the concluding portions hereof, preferred embodiments are provided in the accompanying detailed description which may be understood in conjunction with the accompanying diagrams where like parts in each of the several diagrams are labeled with like numerals, and where:

Fig. 1 is a schematic of an embodiment of a system for using excess power to store energy in the form of hydrogen and oxygen, which can then later be used to provide an energy source for electrical generation, or use as a fuel in hydrogen-powered systems.

Detailed Description of the Invention:

As depicted in Fig. 1, the present disclosure provides a system in which excess energy, for example of wind power or solar power, are converted to a storable energy form that can be used for a variety of purposes, including use to generate electrical power, for example when wind speed decreases, or at night time in the case of solar power facilities. The basic concept is that excess electrical power is used to electrolyze water into its chemical components, hydrogen and oxygen. Electrolysis of water produces these gases in the following stoichiometry:

$$2\ H_2O + \text{electrical current} = 2\ H_2\ (\text{gas}) \text{ and } 2\ O_2\ (\text{gas})$$

In one embodiment, an input stream comprises water collected from a water source **1**. The water can be pre-treated in a filtration and/or distillation system **4** to provide purified water that is then fed into a hydrolysis system **2**. In some cases, the source of water can be seawater, freshwater, or water derived from operation of a power generator as described below. While pre-treatment of the water prior introduction into the hydrolysis system is not mandatory, it will reduce the amount of maintenance required to remove materials other than water that are present, and which will remain behind in the electrolysis system after the water has been broken down into hydrogen and oxygen.

Power to drive the electrolysis system is preferably derived from a renewable energy source **3**. Suitable renewable energy sources include solar power, wind power, hydroelectric power, and the like. Power to drive the electrolysis system is provided in the form of electricity. Passage of electrical current through electrodes within a reaction

chamber in the system in which water is introduced results in the hydrolysis of water into hydrogen **5** and oxygen **6**. Under conditions of ambient temperature and pressure the hydrogen and oxygen will be liberated as gases, which can then be collected as separate output streams for storage **7, 8**. Alternatively, the hydrogen and oxygen output streams can be fed directly into a power generator **9** to produce electric power **12** for use on-site **13**, or for transmission to an electrical grid **14**. Various types of power generation systems configured to produce electricity using the energy provided by the combustion of hydrogen and oxygen are contemplated and described below.

The exhaust from the reaction of hydrogen and oxygen within the power generator **9** will be pure water **10**, initially in the form of water vapor due to the heat of combustion. In some embodiments, the system can be configured such that the water vapor output from the power generator can be condensed and fed back to the electrolysis system **2**. In such cases, this closed loop system would limit the necessity of ongoing access to a large amount of water **1** as an input to the system. Alternatively, the water exhaust **10** from the power generator could be fed to a collector **10a**, and either stored or transported through a pipeline, transport system or other means for other purposes requiring water.

Conveniently, because the water output from the power generator is substantially pure water, an advantage of the current system is that it can be used to process an impure, or otherwise contaminated source of water, to provide uncontaminated water. Thus, the current system can be used to process sources of water that are non-potable and/or used as a desalination system that does not use chemical means to remove salt and other

constituents from seawater before to make it suitable for human consumption and other uses.

In some embodiments, the system can be configured to be a self-contained site for refueling vehicles and other systems that use hydrogen as a fuel source **15**. In these cases, the hydrogen storage **7** can be fed into a delivery system included as part of a fueling station **15**. The hydrogen and oxygen can also be transported by way of pipeline or other forms of transport for offsite use **11, 16**. For example, oxygen produced by the present system is useful in applications other than fuel cells, including for industrial uses such as welding, or as a source of breathable oxygen for medical and aviation uses.

As described above, it may be preferable to remove various components that may be suspended in the water, for example particulates, algae, salts, dissolved metals, and the like. In some embodiments, purification of the water to be used in the electrolysis stage can be purified by techniques such as distillation, or reverse osmosis, with or without prior passage through a filtration medium. Where pre-filtering the water is desired, several possible methods may be used including, and without limitation, sand filters, diatomaceous earth filters, activated alumina, and other natural synthetic resins and compounds.

Once the water is in a condition for processing, it can then be transferred to an electrolysis system **2**. This vessel comprises the various component required to

electrolyze water into its component molecules hydrogen and oxygen, as well as means for separating the two gases from each other once produced.

The electrolysis system will include electrodes that will be immersed in the water. These electrodes can be connected electrically to a source of electrical power, such as that produce by a wind turbine, or from a solar-driven photovoltaic cell array **3**. When power is applied to the vessel, electrical energy will electrolyze the water as described above, producing hydrogen and oxygen, which can then be separated and used as described herein.

For storage of hydrogen and oxygen, it is preferable that the liberated gases from the electrolysis step be stored in a compressed form. Thus, following collection of the gases the hydrogen and oxygen can be processed by liquefaction for hydrogen and oxygen storage **7**,**8**. Conveniently, the liquefied gases can be stored in pressure vessels such as those know in the art. This permits stable storage until the hydrogen and/or oxygen are desired for use in other applications.

Use of the hydrogen and oxygen stored as above can be converted back to electrical energy using one of several forms of power generators **9** powered by the combustion of hydrogen and oxygen. In one embodiment, hydrogen and oxygen are combusted in a combustion chamber, and the heat of combustion can be used to produce steam to drive a steam turbine and electrical generator. In other embodiments, hydrogen and oxygen can be combusted to directly drive a gas turbine system, which in turns drive an electrical

generator. In still other cases, hydrogen and oxygen can be combined in a hydrogen fuel cell to produce electricity.

Other advantages are provided by such a system in that once stored, the hydrogen and oxygen are effectively now portable. As a result, it may be possible to generate hydrogen and oxygen using excess power capacity in one location, and then transport the hydrogen and oxygen for consumption to produce electrical power at another location. For example, this could include places where all the components to drive the system (water, wind, sunshine) are not conveniently available in one place, or where it desirable to have portable sources of fuel and oxidizer to generate power, such as in vehicles, or in mining operations. Similarly, the hydrogen and oxygen can be used in an on-site power generation system to provide electrical power locally, as would needed in installations where the system was not connected to a traditional electrical grid.

As mentioned, another use of the system described would be to provide a self-contained fueling station that could provide hydrogen fuel for vehicles adapted to operate on hydrogen, either through hydrogen driven engines, or that use fuel cells to generate electrical power to drive electric motors. A network of such self-contained facilities could provide fueling options over large geographical areas more cheaply that current systems of centralized fuel production and distribution networks, which require large scale industrial operations for the extraction of fuel from non-renewable sources, and pipelines for distributing those fuel products.

A variety of other considerations will be obvious to those of skill in the art when considering implementation of a system such as disclosed herein. For example, it will be advantageous to place a system near a source of water, or otherwise provide water via a pipeline or other sufficient delivery means. Water use in the cracking vessel need not be pre-treated to remove impurities, but such treatment may be desirable to to reduce the amount of maintenance required for various components of the system. Similarly, the choice of what type of system to use the stored hydrogen and oxygen to produce electrical energy may depend on several factors.

In addition, it will be apparent to those of skill in the art that by routine modification the present invention can be modified for use in a wide range of conditions and applications. It will also be obvious to those of skill in the art there are various ways and designs with which to produce the apparatus and methods of the present invention. The illustrated embodiments are therefore not intended to limit the scope of the invention, but to provide examples of the apparatus and methods to enable those of skill in the art to appreciate the inventive concept.

Those skilled in the art will recognize that any more modifications besides those already described are possible without departing from the inventive concepts herein. The inventive subject matter, therefore, is not to be restricted except in the scope of the appended claims. Moreover, in interpreting both the specification and the claims, all terms are to be interpreted in the broadest possible manner consistent with the context. In particular, terms such as “comprises” and “comprising” should be interpreted as referring

to elements, components, or steps in a non-exclusive manner, indicating that the referenced elements, components, or steps may be present, or utilized, or combined with other elements, components, or steps that are not expressly referenced.

5

Claims:

1. A system for converting energy from a renewable energy source into a storable form of energy, the system comprising:

    a. a source of electrical energy, wherein the electrical energy is generated by a source from a source of renewable energy;

    b. an input stream, the input stream comprising water,

    c. an electrolysis system, the electrolysis system configured to use the source of electrical energy to convert the water into hydrogen and oxygen, wherein the electrolysis system further comprises separate hydrogen and oxygen output streams;

    d. a hydrogen storage system;

    e. an oxygen storage system;

    f. a power generator, wherein the power generator is configured to use at least a portion of the hydrogen and oxygen generated by the electrolysis system to produce electrical power; and

    g. a collector system, the collector system configured to collected exhaust created by the power generator, wherein the exhaust from the collector system can provide the input stream for the electrolysis system;

wherein the portion of hydrogen and oxygen not used by the power generator is available as a storable form of energy.

2. The system of claim 1, wherein the input stream is one of fresh water and sea water.

3. The system of claim 1, further comprising a water treatment system comprising at least one of a filtration system, a distillation system, and a deionizing system, the water treatment system configured to partially purify the input stream prior to introduction the input stream into the electrolysis system.

4. The system of claim 1, wherein the input stream comprises water recovered from the power generator.

5. The system of claim 1, wherein the system is configured to transmit electrical power to an electrical grid distribution system.

6. The system of claim 1, wherein the system is configured to refuel vehicles that operate on hydrogen consuming fuel systems.

7. A method for converting energy from a renewable energy source into a storable form of energy, the method comprising:

a. providing a source of electrical energy, wherein the electrical energy is generated by a source from a source of renewable energy;

b. providing an input stream, the input stream comprising water;

c. providing an electrolysis system, the electrolysis system configured to use the source of electrical energy to convert the water into hydrogen and oxygen, wherein the electrolysis system further comprises separate hydrogen and oxygen output streams;

d. introducing water into the electrolysis system;

e. operating the electrolysis system such that water is converted into hydrogen and oxygen gas;

f. providing a hydrogen storage system;

g. providing an oxygen storage system;

h. providing a power generator, wherein the power generator is configured to use at least a portion of the hydrogen and oxygen generated by the electrolysis system to produce electrical power;

i. providing a collector system, the collector system configured to collected exhaust created by the power generator, wherein the exhaust from the collector system can provide the input stream for the electrolysis system; and

j. storing the portion of the hydrogen and oxygen not used by the power generator.

8. The method of claim 1, wherein the input stream is one of fresh water and sea water.

9. The method of claim 1, further comprising:

a. providing a water treatment system, the water treatment system comprising at least one of a filtration system, a distillation system, and a deionizing system, the water treatment system configured to partially purify the input stream prior to introduction the input stream into the electrolysis system, and

b. processing the input stream with the water treatment system prior to introducing the input stream into the electrolysis system.

10. The method of claim 1, further comprising using water recovered from the power generator as at least a portion of the input stream.

11. The method of claim 1, further comprising transmitting electrical power to an electrical grid distribution system.

12. The method of claim 1, further comprising using hydrogen generated by the electrolysis system to refuel vehicles that operate on hydrogen consuming fuel systems.

PCT

REQUEST

The undersigned requests that the present international application be processed according to the Patent Cooperation Treaty.

For receiving Office use only

International Application No.

International Filing Date

Name of receiving Office and "PCT International Application"

Applicant's or agent's file reference *(if desired) (12 characters maximum)* 869-004

Box No. I TITLE OF INVENTION

RENEWABLE ENERGY SYSTEM

Box No. II APPLICANT ☒ This person is also inventor

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country. The country of the address indicated in this Box is the applicant's State (that is, country) of residence if no State of residence is indicated below.)*

MILOS, Marvin
P.O. Box 227
Balgonie, Saskatchewan
Canada S0G 0E0

Telephone No.

Facsimile No.

Applicant's registration No. with the Office

E-mail authorization: Marking one of the check-boxes below authorizes the receiving Office, the International Searching Authority, the International Bureau and the International Preliminary Examining Authority to use the e-mail address indicated in this Box to send, notifications issued in respect of this international application to that e-mail address if those offices are willing to do so.

☐ as advance copies followed by paper notifications; or ☐ exclusively in electronic form (no paper notifications will be sent).

E-mail address:

State *(that is, country)* of nationality: CA

State *(that is, country)* of residence: CA

This person is applicant for the purposes of: ☒ all designated States ☐ the States indicated in the Supplemental Box

Box No. III FURTHER APPLICANT(S) AND/OR (FURTHER) INVENTOR(S)

☐ Further applicants and/or (further) inventors are indicated on a continuation sheet.

Box No. IV AGENT OR COMMON REPRESENTATIVE; OR ADDRESS FOR CORRESPONDENCE

The person identified below is hereby/has been appointed to act on behalf of the applicant(s) before the competent International Authorities as: ☒ agent ☐ common representative

Name and address: *(Family name followed by given name; for a legal entity, full official designation. The address must include postal code and name of country.)*

FURMAN, CORY J.
FURMAN IP LAW & STRATEGY PC
300 - 1914 Hamilton Street
Regina, Saskatchewan
Canada S4P 3N6

Telephone No. 306-992-0740

Facsimile No. 306-992-5604

Agent's registration No. with the Office

E-mail authorization: Marking one of the check-boxes below authorizes the receiving Office, the International Searching Authority, the International Bureau and the International Preliminary Examining Authority to use the e-mail address indicated in this Box to send, notifications issued in respect of this international application to that e-mail address if those offices are willing to do so.

☒ as advance copies followed by paper notifications; or ☐ exclusively in electronic form (no paper notifications will be sent).

E-mail address: cfurman@furmanip.com

☐ **Address for correspondence:** Mark this check-box where no agent or common representative is/has been appointed and the space above is used instead to indicate a special address to which correspondence should be sent.

Box No. V DESIGNATIONS

The filing of this request **constitutes under Rule 4.9(a) the designation** of all Contracting States bound by the PCT on the international filing date, for the grant of every kind of protection available and, where applicable, for the grant of both regional and national patents.

However,

☐ DE Germany **is not designated** for any kind of national protection

☐ JP Japan **is not designated** for any kind of national protection

☐ KR Republic of Korea **is not designated** for any kind of national protection

(The check-boxes above may only be used to exclude (irrevocably) the designations concerned if, at the time of filing or subsequently under Rule 26bis.1, the international application contains in Box No. VI a priority claim to an earlier national application filed in the particular State concerned, in order to avoid the ceasing of the effect, under the national law, of this earlier national application.)

Box No. VI PRIORITY CLAIM AND DOCUMENT

The priority of the following earlier application(s) is hereby claimed:

Filing date of earlier application *(day/month/year)*	Number of earlier application	Where earlier application is:		
		national application: country or Member of WTO	regional application: regional Office	international application: receiving Office
item (1) 27/06/2016	2933996	CA		
item (2)				
item (3)				

☐ Further priority claims are indicated in the Supplemental Box.

Furnishing the priority document(s):

☒ The **receiving Office** is requested to prepare and transmit to the International Bureau a certified copy of the earlier application(s) *(only if the earlier application(s) was filed with the receiving Office which, for the purposes of this international application, is the receiving Office)* identified above as:

☒ all items ☐ item (1) ☐ item (2) ☐ item (3) ☐ other, see Supplemental Box

☐ The **International Bureau** is requested to obtain from a digital library a certified copy of the earlier application(s) identified above, using, where applicable, the access code(s) indicated below *(if the earlier application(s) is available to it from a digital library)*:

☐ item (1) access code _____ ☐ item (2) access code _____ ☐ item (3) access code _____ ☐ other, see Supplemental Box

Restore the right of priority: the receiving Office is requested to restore the right of priority for the earlier application(s) identified above or in the Supplemental Box as item(s) (_____). *(See also the Notes to Box No. VI; further information **must** be provided to support a request to restore the right of priority.)*

Incorporation by reference: where an element of the international application referred to in Article 11(1)(iii)(d) or (e) or a part of the description, claims or drawings referred to in Rule 20.5(a) is not otherwise contained in this international application but is completely contained in an earlier application whose priority is claimed on the date on which one or more elements referred to in Article 11(1)(iii) were first received by the receiving Office, that element or part is, subject to confirmation under Rule 20.6, incorporated by reference in this international application for the purposes of Rule 20.6.

Box No. VII INTERNATIONAL SEARCHING AUTHORITY

Choice of International Searching Authority (ISA) *(if more than one International Searching Authority is competent to carry out the international search, indicate the Authority chosen; the two-letter code may be used)*:

ISA/ CA

Sheet No. 3

Box No. IX CHECK LIST for PAPER filings – this sheet is only to be used when filing an international application on **PAPER**

This international application **contains the following:**	Number of sheets
(a) request form PCT/RO/101 (including any declarations and supplemental sheets)	3
(b) description (excluding any sequence listing part of the description, see (f), below)	16
(c) claims	5
(d) abstract	1
(e) drawings (if any)	1
(f) sequence listing part of the description (if any)	
Total number of sheets	26

This international application is **accompanied by** the following item(s) *(mark the applicable check-boxes below and indicate in right column the number of each item):*	Number of items
1. ☒ fee calculation sheet	1
2. ☐ original separate power of attorney	
3. ☐ original general power of attorney	
4. ☐ copy of general power of attorney; reference number:	
5. ☐ priority document(s) identified in Box No. VI as item(s)	
6. ☐ Translation of international application into *(language)*:	
7. ☐ separate indications concerning deposited microorganism or other biological material	
8. ☐ *(only where item (f) is marked in the left column)* copy in electronic form (Annex C/ST.25 text file) on physical data carrier(s) of the sequence listing, not forming part of the international application, which is **furnished only for the purposes of international search** under Rule 13*ter* *(type and number of physical data carriers)*	
9. ☐ *(only where item (f) (in the left column) and item 8 (above) are marked)* a statement confirming that "the information recorded in electronic form submitted under Rule 13*ter* is identical to the sequence listing as contained in the international application" as filed on paper	
10. ☐ copy of results of earlier search(es) (Rule 12*bis*.1(a))	
11. ☐ other *(specify)*:	

Figure of the drawings which should accompany the abstract: 1

Language of filing of the international application: English

Box No. X SIGNATURE OF APPLICANT, AGENT OR COMMON REPRESENTATIVE

Next to each signature, indicate the name of the person signing and the capacity in which the person signs (if such capacity is not obvious from reading the request).

CORY J. FURMAN, Agent

For receiving Office use only

1. Date of actual receipt of the purported international application:	2. Drawings: ☐ received:
3. Corrected date of actual receipt due to later but timely received papers or drawings completing the purported international application:	
4. Date of timely receipt of the required corrections under PCT Article 11(2):	☐ not received:
5. International Searching Authority (if two or more are competent): ISA /	6. ☐ Transmittal of search copy delayed until search fee is paid

For International Bureau use only

Date of receipt of the record copy by the International Bureau:

This sheet is not part of and does not count as a sheet of the international application.

PCT

FEE CALCULATION SHEET

Annex to the Request

For receiving Office use only

International Application No.

Date stamp of the receiving Office

Applicant's or agent's file reference: 869-004

Applicant: MILOS, Marvin

CALCULATION OF PRESCRIBED FEES

(Applicants may be entitled to a reduction of certain fees as indicated in the PCT Fee Tables (http://www.wipo.int/pct/en/fees.pdf))

1. TRANSMITTAL FEE: 300 [T]

2. SEARCH FEE: 1600 [S]

   International search to be carried out by: CA

3. INTERNATIONAL FILING FEE

   Enter total number of sheets indicated in Box No IX: 26

   [i1] Fixed amount for the first 30 sheets: 1792 [i1]

   [i2] 0 (number of sheets in excess of 30) x _____ (fee per sheet) = _____ [i2]

   Add amounts entered at i1 and i2 and enter total at I: 3692 [I]

   (Applicants from certain States are entitled to a reduction of 90% of the international filing fee (see http://www.wipo.int/pct/en/fees/fee_reduction.pdf). Where the applicant is (or all applicants are) so entitled, the total to be entered at I is 10% of the international filing fee.)

4. FEE FOR PRIORITY DOCUMENT *(if applicable)*: _____ [P]

5. FEE FOR RESTORATION OF THE RIGHT OF PRIORITY *(if applicable)*: _____ [RP]

6. FEE FOR EARLIER SEARCH DOCUMENTS *(if applicable)*: _____ [ES]

7. TOTAL FEES PAYABLE: 3692

   Add amounts entered at T, S, I, P, RP and ES, and enter total in the TOTAL box

   TOTAL

MODE OF PAYMENT *(Not all modes of payment may be available at all receiving Offices)*

- ☐ credit card *(details should not be included on this sheet)*
- ☐ authorization to charge deposit or current account (see below)
- ☐ bank transfer
- ☐ cash
- ☐ postal money order
- ☐ check
- ☐ revenue stamps
- ☒ other *(specify)*: deferred

AUTHORIZATION TO CHARGE (OR CREDIT) DEPOSIT OR CURRENT ACCOUNT

(This mode of payment may not be available at all receiving Offices)

- ☐ Authorization to charge the total fees indicated above.
- ☐ *(This check-box may be marked only if the conditions for deposit or current accounts of the receiving Office so permit)* Authorization to charge any deficiency or credit any overpayment in the total fees indicated above.
- ☐ Authorization to charge the fee for priority document.

Receiving Office: RO/ _____

Deposit or Current Account No.: _____

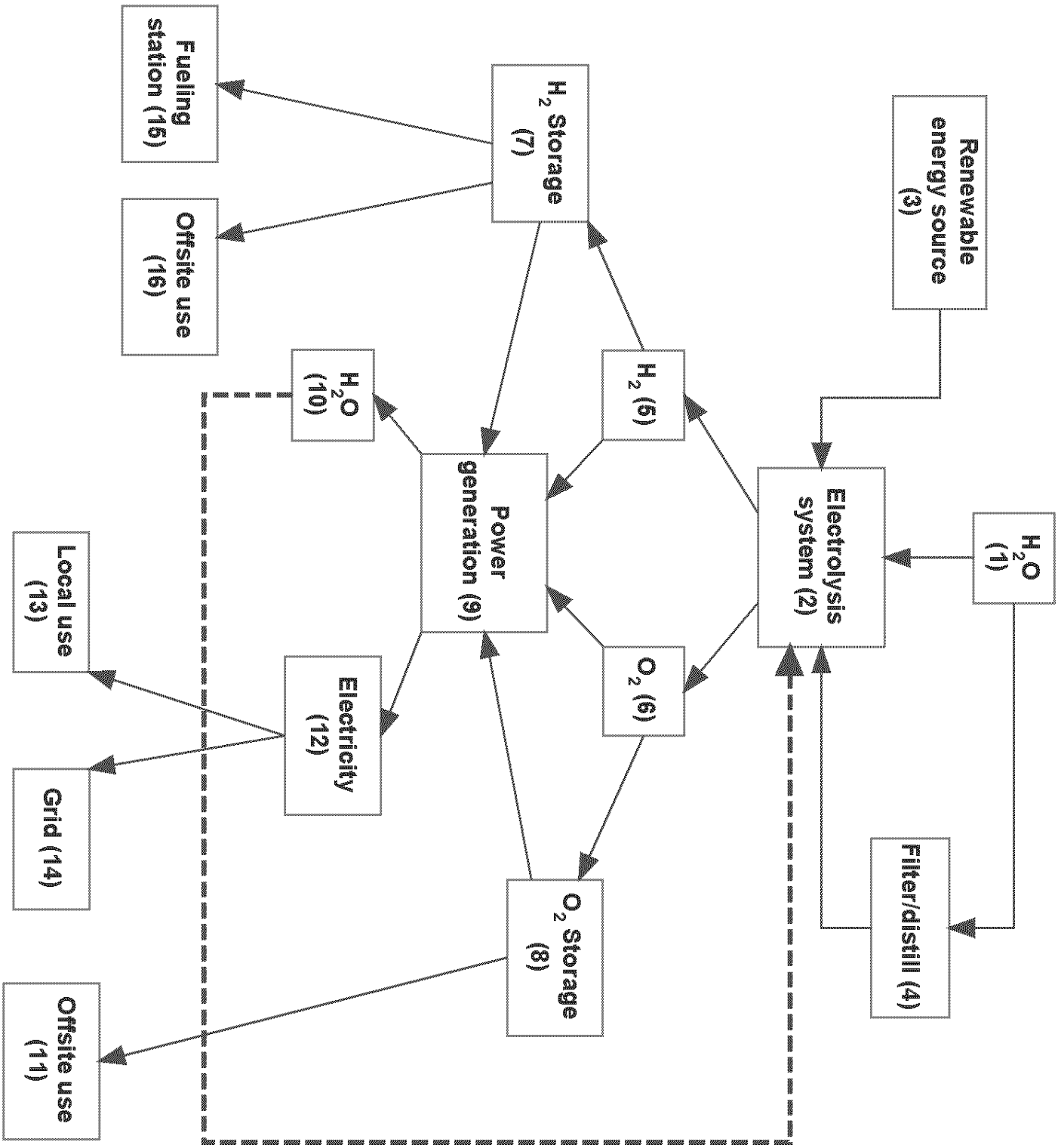
Date: _____

Name: _____

Signature: _____

See Notes to the fee calculation sheet

FIGURE 1:


Renewable energy source (3)
H_2O (1)
Electrolysis system (2)
Filter/distill (4)
H_2 Storage (7)
Fueling station (15)
Offsite use (16)
H_2 (5)
H_2O (10)
Power generation (9)
O_2 (6)
Local use (13)
Electricity (12)
Grid (14)
O_2 Storage (8)
Offsite use (11)