FORM 2

THE PATENTS ACT, 1970

(39 OF 1970)

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The Patent Rules, 2003

PROVISIONAL SPECIFICATION

(see sections 10 & rule 13)

1. TITLE OF THE INVENTION

SYSTEM AND METHOD FOR GENERATING ELECTRICITY IN REAL-TIME BY UTILIZING RENEWABLE ENERGY

2. APPLICANTS (S)

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3 PREAMBLE TO THE DESCRIPTION

PROVISIONAL SPECIFICATION

The following specification describes the invention.

TECHNICAL FIELD

[0001] The present disclosure relates to the field of an electricity generation system. More particularly the present disclosure relates to a universal on-board system and method for generating electricity in real-time by utilizing wind renewable energy.

BACKGROUND

[0002] The following description of the related art is intended to provide background information pertaining to the field of the present disclosure. This section may include certain aspects of the art that may be related to various features of the present disclosure. However, it should be appreciated that this section is used only to enhance the understanding of the reader with respect to the present disclosure, and not as admissions of the prior art.

[0003] Conventionally, generation of electricity using wind turbines is well known in the prior art. The wind turbines generally include a vertical tower which supports a turbine operatively connected to a propeller which spins on a horizontal axis or to another device designed to take advantage of the moving wind. The wind turbine infrastructure require a much larger footprint and thus tend to take up too much space for large scale use. The generation of electricity using the wind turbine infrastructure impacts the production due to variable wind speeds. The wind turbine infrastructure causes environmental impacts on wildlife.

[0004] Further, the generation of electricity using a solar panels infrastructure is well known in the prior art. The solar panels infrastructure requires a large area, and the solar is a problematic source of energy because of its intermittency, and weather dependence. The installation and maintenance of the electrification infrastructure can be prohibitively expensive, particularly in remote or economically constrained areas. The search of sustainable energy sources is often accompanied by a number of environmental considerations and challenges. For example, large dams, while capable of generating significant amounts of hydroelectric power, raise concerns regarding their environmental impact. Limited suitable locations, reservoir-related issues such as habitat disruption, and the displacement of communities are among the key factors to address. Geothermal

power, reliant on specific geographic locations with suitable underground heat sources, faces risks of resource depletion and environmental damage from drilling activities, including seismic concerns. Bioenergy derived from biomass presents a complex landscape, with debates over land use competing with food production, greenhouse gas emissions from production processes, and the imperative of ensuring a sustainable biomass supply. Nuclear power, despite its potential as a low-carbon energy source, struggles with safety concerns heightened by past accidents, challenges in nuclear waste disposal, and substantial upfront construction costs.

[0005] Furthermore, the conventional systems face challenges related to on-board electricity generation and storage. For instance, the traditional trains rely on external power sources or on fuel for operation, posing challenges for sustainability and environmental impact. Efficient energy storage solutions on trains may be limited, impacting the ability to store and use energy effectively. Transmitting and distributing energy from on-board sources to utility-scale storage can encounter efficiency challenges. Therefore, there is a need to develop a system to address the challenges and problems in the field of transportation and energy generation.

[0006] There is, therefore, a need in the art to provide a system and method that can overcome the shortcomings of the existing prior arts.

OBJECTS OF THE PRESENT DISCLOSURE

[0007] Some of the objects of the present disclosure, which at least one embodiment herein satisfies are as listed herein below.

[0008] It is an object of the present disclosure to provide a system and method for generating electricity in real-time by utilizing wind renewable energy.

[0009] It is another object of the present disclosure to provide a system and method for generating electricity in real-time by utilizing wind renewable energy, which integrates as a component within a train's composition, serving as a unique energy generation solution.

[0010] It is another object of the present disclosure to provide a system and method for generating electricity in real-time by utilizing wind renewable energy, which captures wind energy while the train is in motion to generate electricity.

[0011] It is another object of the present disclosure to provide a system and method for generating electricity in real-time by utilizing wind renewable energy, which stores the generated electricity within dedicated energy storage units positioned inside an energy storage cabinet on specific train coaches, and facilitates a continuous and sustainable power supply.

[0012] It is another object of the present disclosure to provide a system and method for generating electricity in real-time by utilizing wind renewable energy, which enables to transmit the energy storage units to locally situated energy storage plants once the energy storage units are fully charged.

[0013] It is another object of the present disclosure to provide a system and method for generating electricity in real-time by utilizing wind renewable energy, which facilitates a large-scale electricity production, an environmentally conscious and efficient energy utilization strategy, and ensures a seamless and uninterrupted power supply.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] In the figures, similar components and/or features may have the same reference label. Further, various components of the same type may be distinguished by following the reference label with a second label that distinguishes among the similar components. If only the first reference label is used in the specification, the description is applicable to any one of the similar components having the same first reference label irrespective of the second reference label.

[0015] FIG. 1 illustrates an exemplary representation of the proposed system for generating electricity in real-time by utilizing wind renewable energy, in accordance with an embodiment of the present disclosure.

[0016] FIG. 2 illustrates another exemplary representation of the proposed system, in accordance with an embodiment of the present disclosure.

[0017] FIG. 3 illustrates a flow diagram illustrating a method for generating electricity in real-time by utilizing wind renewable energy, in accordance with an embodiment of the present disclosure.

DETAILED DESCRIPTION

[0018] The following is a detailed description of embodiments of the disclosure depicted in the accompanying drawings. The embodiments are in such detail as to clearly communicate the disclosure. However, the amount of detail offered is not intended to limit the anticipated variations of embodiments; on the contrary, the intention is to cover all modifications, equivalents, and alternatives falling within the scope of the present disclosure as defined by the appended claims.

[0019] In the following description, numerous specific details are set forth in order to provide a thorough understanding of embodiments of the present disclosure. It will be apparent to one skilled in the art that embodiments of the present disclosure may be practiced without some of these specific details.

[0020] Various aspects of the present disclosure are described with respect to FIG 1-3.

[0021] The present disclosure relates to the field of an electricity generation system. More particularly the present disclosure relates to a universal on-board system and method for generating electricity in real-time by utilizing wind renewable energy.

[0022] An aspect of the present disclosure relates to a system for generating electricity in real-time by utilizing wind renewable energy. The system comprising a plurality of turbines positioned in a cabinet, where the plurality of turbines configured to enable a plurality of turbine blades to rotate while a train is in motion. The system includes a generator configured to convert the wind energy into electricity. The system includes a generator configured to transfer the electricity to store the electricity in the energy storage units.

[0023] In an aspect, a method for generating electricity in real-time by utilizing wind renewable energy. The method includes steps of enabling, by a system, a plurality of turbines positioned in a cabinet to rotate a plurality of turbine blades by capturing wind energy while the train is in motion. The method includes converting,

by the system, the wind energy into electricity by a turbine generator. The method includes transferring, by the system, the electricity to energy storage units to store the electricity for distribution.

[0024] FIG. 1 illustrates an exemplary representation of the system for generating electricity in real-time by utilizing wind renewable energy, in accordance with an embodiment of the present disclosure.

[0025] In an embodiment, referring to FIG. 1, the system 102 will be connected to a network, which is further connected to at least one computing device associated with one or more users.

[0026] In an exemplary embodiment, the computing device may include, but not be limited to, a computer enabled device, a mobile phone, a smartphone, a tablet, or some combination thereof. A person of ordinary skill in the art will understand that the at least one computing device may be individually referred to as a computing device and collectively referred to as computing devices. The computing device may be operated by at least one user. The user may include, but not limited to, a train pilot, a train conductor, a locomotive pilot, a train engineer, a train driver, a railway station master, a railway station manager, a railway station supervisor, a railway station operations manager, a railway station administrator, and the like.

[0027] In an exemplary embodiment, the network may include, but not be limited to, at least a portion of one or more networks having one or more nodes that transmit, receive, forward, generate, buffer, store, route, switch, process, or a combination thereof, etc. one or more messages, packets, signals, waves, voltage or current levels, some combination thereof, or so forth. In an exemplary embodiment, the network may include, but not be limited to, a wireless network, a wired network, an internet, an intranet, a public network, a private network, a packet-switched network, a circuit-switched network, an ad hoc network, an infrastructure network, a Public-Switched Telephone Network (PSTN), a cable network, a cellular network, a satellite network, a fiber optic network, or some combination thereof.

[0028] In an embodiment, the system 100 includes a cabinet 102, a plurality of turbines 104-1, and 104-2, (collectively referred as user 104, herein), a generator 106, a charge controller 108, and energy storage units 110-1, and 110-2,

(collectively referred as user 110, herein). The cabinet 102 is seamlessly integrated as a component within the train's composition, serving as a unique energy generation solution. The cabinet 102 may be attached to the train coach. The on-board turbines 104 may be configured to capture wind energy while the train in motion. The integration of horizontal axis wind turbines 104 may be configured to addresses the need for on-board energy generation, utilizing wind energy to power the train while in motion.

[0029] The generated electricity is stored within dedicated energy storage units 110, where the energy storage units 110 are positioned in the cabinet 102 on specific train coaches, facilitating a continuous and sustainable power supply. The stored electricity is subsequently transmitted to utility-scale energy storage facilities strategically positioned across the universe. Concurrently, the electricity is available for consumption by the train during its operation. Once the energy storage units 110 are fully charged in the cabinet 102, they are transmitted to locally situated energy storage plants. The process involves the exchange of fully charged ones with depleted cabinets. The system 100 may enable to capture trains or specific train fleets as effective contributors to large-scale electricity production, presenting an environmentally conscious and efficient energy utilization strategy, ensuring a seamless and uninterrupted power supply.

[0030] In an embodiment, the turbines 104 include a plurality of rotor blades 122-2 of the turbine 122-1 may be configured to rotate and generate mechanical energy through at least one of a natural wind, and a wind generated while the train is in motion.

[0031] In an embodiment, the system 100 include the generator 106 which may be configured to generate electrical energy and stores the electrical energy in the plurality of energy storage units 110.

[0032] In an embodiment, the plurality of energy storage units 110 may provide electricity to the strategically positioned utility-scale energy storage facilities, optimizing the efficiency of electricity distribution. The plurality of energy storage units are transmitted to utility-scale energy storage facilities across the universe through the on-board transmission mechanism. Example: When the train reaches a

designated station, manual transmits the energy storage units to the power distribution plants. The distributed electricity is available for consumption by the train during its operation, meeting the power demands of various systems on board. Example: Energy is supplied to Rural and Urban Areas and based on demand. The system 100 functions without interruption, ensuring accessibility at all times, day or night. The system 100 may be configured to harness wind energy for large-scale electricity production while ensuring efficient energy utilization and environmental consciousness.

[0033] In an embodiment, the system 100 includes the charge controllers 108 are attached along with energy storage systems, to control Cut-in and Cut-out Wind Speed. The system 100 configured to transfer alerts to the computing device associated with the user. The alerts may include, information about the electric charging units.

[0034] FIG. 2 illustrates another exemplary representation of the system, in accordance with an embodiment of the present disclosure.

[0035] In an embodiment, the system 100 include the wind turbines 104 to harness wind energy from various directions as the train moves, regardless of the wind's orientation relative to the train's movement. The captured wind energy is stored in the dedicated energy storage system cabinets on specific train coaches. For example: during periods of high wind speed or when the train is moving downhill, excess energy is stored in the on-board cabinets for later use. The fully charged Energy Storage System Cabinets can be exchanged with depleted ones to maintain a continuous and seamless power supply. Example: At designated intervals or stations, the exchange process occurs. The system 100 provides continuous power supply ensures the reliability of train operations, even in challenging terrains or remote locations. The system 100 transmits and distributes electricity, to optimize energy efficiency and utilization. The trains equipped with the on-board wind energy harvesting system 100 become active contributors to large-scale electricity production, supporting national energy grids. The cabinet are attached at the end of the train coaches to make it easy to attach and detach.

[0036] In an exemplary embodiment, the Storage Capacity may include 50 kWh to 500 kWh per cabinet. Transmission Efficiency may include 90% to 98%. Transmission Distance may be 100 km to 500 km. Distribution Efficiency may be 90% to 95%. Voltage Range includes 400V to 800V (depends on turbine capability. Charge/Discharge Efficiency includes 85% to 95%. Storage Temperature Range between 20°C to 40°C Transmission Voltage. Assuming 10 to 50 kV based on turbines. Transmission Losses may be 2% to 5%. On-Board Power Consumption may be 10 kWh/h to 50 kWh/h. Distribution Voltage on Train may be 400V to 600V.

[0037] FIG. 3 illustrates a flow diagram illustrating a method for generating electricity in real-time by utilizing wind renewable energy, in accordance with an embodiment of the present disclosure.

[0038] In an embodiment, in step 302, the method 300 includes enabling, by a system, a plurality of turbines positioned in a cabinet to rotate a plurality of turbine blades by capturing wind energy while the train is in motion.

[0039] In an embodiment, in step 304, the method 300 includes converting, by the system, the wind energy into electricity by a turbine generator.

[0040] In an embodiment, in step 306, the method 300 includes transferring, by the system, the electricity to energy storage units to store the electricity for distribution.

[0041] Moreover, in interpreting the specification, all terms should be interpreted in the broadest possible manner consistent with the context. In particular, the terms "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. Where the specification claims refer to at least one of something selected from the group consisting of A, B, C ….and N, the text should be interpreted as requiring only one element from the group, not A plus N, or B plus N, etc.

[0042] While the foregoing describes various embodiments of the proposed disclosure, other and further embodiments of the proposed disclosure may be devised without departing from the basic scope thereof. The scope of the proposed

disclosure is determined by the claims that follow. The proposed disclosure is not limited to the described embodiments, versions or examples, which are included to enable a person having ordinary skill in the art to make and use the invention when combined with information and knowledge available to the person having ordinary skill in the art.

ADVANTAGES OF THE PRESENT DISCLOSURE

[0043] The present disclosure provides a system and method for generating electricity in real-time by utilizing wind renewable energy.

[0044] The present disclosure provides a system and method which offers a sustainable power supply by capturing and storing wind energy, reducing dependence on non-renewable sources.

[0045] The present disclosure provides a system and method which triggers energy storage unit's information as alerts to a computing device over a network.

[0046] The present disclosure provides a system and method which mitigates the intermittency of wind energy by storing it on trains and utilizing a strategic exchange process to ensure a seamless and uninterrupted power supply.

[0047] The present disclosure provides a system and method which promotes an environmentally conscious approach by harnessing wind energy, reducing reliance on non-renewable resources, and contributing to sustainable energy practices.

[0048] The present disclosure provides a system and method which allows trains to become effective contributors to large-scale electricity production, addressing the need for decentralized and sustainable power sources.

[0049] The present disclosure provides a system and method which combines on-board wind energy generation, efficient storage, and strategic transmission, thereby promoting sustainability, reliability, and large-scale electricity production by trains.

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ABSTRACT

SYSTEM AND METHOD FOR GENERATING ELECTRICITY IN REAL-TIME BY UTILIZING RENEWABLE ENERGY

The present disclosure relates to a system for generating electricity in real-time by utilizing wind renewable energy. The system comprising a plurality of turbines positioned in a cabinet, where the plurality of turbines configured to enable a plurality of turbine blades to rotate while a train is in motion. The system includes a generator configured to convert the wind energy into electricity. The system includes a generator configured to transfer the electricity to store the electricity in the energy storage units.

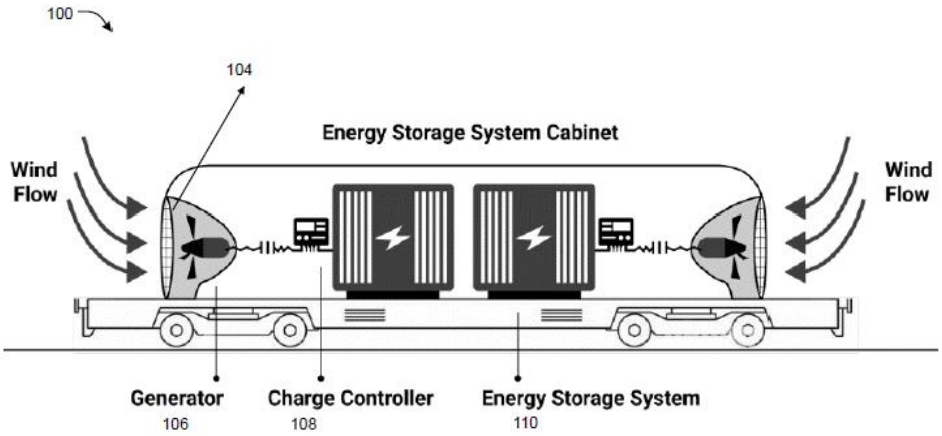

FIG. 1