Patent application requirements for underwater energy storage systems

What is underwater compressed energy storage?
Underwater compressed energy storage is similar to CAES,with the major difference being that the air is compressed in a container located underwater. Several approaches to UWCAES are under development including the utilization of distensible air container also referred to as an Energy Bag ,.

What is buoyancy battery underwater energy storage?
Buoyancy battery underwater energy storage is an emerging area of research relating to the storage of energy generated by renewable resources such as offshore wind and solar. This study presents an experimental analysis of a basic buoyancy system.

What is offshore energy storage?
ORES (Ocean Renewable Energy Storage) is another approach to offshore energy storage which utilizes large concrete spherical structures mounted to waterbed , . Water is pumped from these large containers during charge phase and is allowed to reenter the container through a turbine on discharge phase.

The UW-ES system is compact and economical, and allows for highly synergistical integration with various power take-off systems. AB - The invention provides an underwater energy storage system (UW-ES system) comprising a reservoir structure (5), which is resting at the bottom (4) of a waterbody (1), such as a sea, an ocean, a waterway, etc.

An underwater energy storage system includes a tank for storing a compressed gas that is adapted to be stored underwater. The tank includes at least one water opening through which water from surrounding environment can flow into and out of the tank, and at least one gas opening through which the compressed gas is received. The underwater energy storage ...

Japanese Patent Application No. JP2271032 published on Nov. 6, 1990, entitled "Compressed air storage device for underwater installation and submerging method thereof," the contents of which is incorporated by reference, describes an underwater installation compressed air storage device including main compressed air storage tank of bottomless shell construction and an additional ...

Energy storage can provide a buffer to better match power demand and supply allowing power sources to operate at higher capacity and thus higher efficiency. Cost ...

At 500 m depth the energy density is between 5.6 kW h/m 3 and 10.3 kW h/m 3, depending upon how the air is reheated before/during expansion.The lower limit on energy density at this depth is over three times the energy density in the 600 m high upper reservoir at Dinorwig pumped storage plant in the UK.At depths of the order of hundreds of meters, wave ...

water or pumped air energy storage systems that are economi cal, Scalable, and deployable in a wide variety of locations. 0005 Improvements in energy storage systems are there fore desirable. SUMMARY OF THE INVENTION 0006. The present disclosure includes an exemplary energy storage system that includes a buoyant balloon Sus May 6, 2010

There is described an energy storage system (300, 310) for storing energy in connection with a renewable energy generating facility (100). The energy storage system (300, 310) is operable to employ one or more of: (a) compressed air energy storage apparatus (300, 310) for storing energy generated by the energy generating facility (100), the stored energy ...

The underwater energy storage system further includes at least one duct communicating between the at least one opening for gas flow and a source of compressed gas and a compartment constructed over a roof of the tank, wherein said compartment is adapted for receiving weights at a sinking site of the tank. ... Japanese Patent Application No ...

One particular approach to addressing intermittency of an energy resource is through energy storage (ES). Many different methods and techniques for achieving ES exist, each with particular application requirements. Although ...

The invention provides an underwater energy storage system (UW-ES system) comprising a reservoir structure (5), which is resting at the bottom (4) of a waterbody (1), such as a sea, an ocean, a waterway, etc. The reservoir structure has a pressurizing reservoir (7A, 7B) with a deformable wall structure (17A, 17B) and a depressurizing reservoir (8A, 8B) with a rigid wall ...

The underwater energy storage system comprises a hollow shaft, a generator, a motor and a mass attached to the motor. The hollow shaft is supported on a foundation ...

Variable speed hydropower generation and its application in pumped storage power plants are presented in detail. Moreover, revolutionary concepts for hydroelectric energy storage are also presented with the analysis focusing on underwater hydro storage and hydropower"s hybridisation with fast energy storage systems.

The present invention relates to systems and methods for pumping or removing a fluid from a region within or on top of or in contact with a water or liquid body and applications for said systems and methods. Some embodiments may be applicable to, for example, inhibiting or preventing growth formation or fouling of structures in liquid environments.

JP6270935B2 - Underwater energy storage for BOP - Google Patents Underwater energy storage for BOP Download PDF Info Publication number ... Application number JP2016156250A Other languages Japanese (ja) Other versions JP2016191303A5 (en JP2016191303A (en Inventor ??. ???? ?????

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Justia Patents Storage Container U.S. Patent for Underwater energy storage using compressed ... U.S. patent application Ser. No. 12/888,971 filed 23 Sep. 2010 relates to the present specification and its disclosure is hereby incorporated in the present specification. ... The disclosed compressed fluid energy storage systems have cost advantages ...

energy power take storage system pressurizing Prior art date 2017-12-11 Legal status (The legal status is an assumption and is not a legal conclusion. Google has not performed a legal analysis and makes no representation as to the accuracy of the status listed.) Active Application number US16/770,870 Other languages English (en) Other versions

CAES, a long-duration energy storage technology, is a key technology that can eliminate the intermittence and fluctuation in renewable energy systems used for generating electric power, which is expected to accelerate renewable energy penetration [7], [11], [12], [13], [14].The concept of CAES is derived from the gas-turbine cycle, in which the compressor ...

These novel systems and methods enable the use of underwater pumped-hydro energy storage to provide an efficient and economical way for power utilities to store excessive electricity that...

An underwater energy storage system comprising a container where energy is stored by transporting water between the container and a body of water, is disclosed. 5 The container comprises a water- and gas-tight membrane surrounding a container volume, where the container is rendered mainly incompressible by a fill material comprising densely packed, ...

European Patent Office Prior art keywords container water energy storage storage system void Prior art date 2018-03-23 Legal status (The legal status is an assumption and is not a legal conclusion. Google has not performed a legal analysis and makes no representation as to the accuracy of the status listed.) Active Application number EP19716597.0A

A compressed fluid storage system includes a bi-directional compressor / expander (C / E) unit configured to compress fluid during a first mode of operation and to allow expansion of the fluid during a second mode of operation; A fluid storage system located on the sea floor below and a pipe arranged between the C / E unit and the fluid storage system and configured to move ...

An underwater pumped-hydro energy storage device includes a submersible tank that includes an inlet and an outlet. ... This application is a divisional of U.S. patent application Ser. No. 12/577,852 to Hull, et al., filed Oct. 13, 2009, entitled UNDERWATER PUMPED-HYDRO ENERGY STORAGE, the disclosure of which is incorporated herein by reference ...

Justia Patents U.S. Patent Application for SYSTEMS WITH UNDERWATER DATA CENTERS WITH LATTICES AND COUPLED TO RENEWABLE ENERGY SOURCES Patent Application (Application

#20230076681) ... The energy requirement of each data center node 12 is typically 100 W to 2 kW. In one embodiment, an optional single inductive source is provided ...

An underwater energy storage system includes a tank for storing a compressed gas that is adapted to be stored underwater. The tank includes at least one water opening through which ...

Utilizing a simple pulley, reel and float mechanism, energy can be stored for an indefinite period of time. Governing equations of charge and discharge are defined through ...

The present U.S. Utility patent application claims priority pursuant to 35 U.S.C. § 121 as a divisional of U.S. Utility application Ser. No. 15/411,154, entitled "ENERGY STORAGE SYSTEM", filed Jan. 20, 2017, which is hereby incorporated by reference in its entirety and made part of the present U.S. Utility patent application for all purposes.

UNDERWATER ENERGY STORAGE SYSTEM - Patent 4074961 (19) (11) EP 4 074 961 A1 (12) EUROPEAN PATENT APPLICATION (43) Date of publication: 19.10.2022 Bulletin 2022/42 (21) Application number: 21168329.7 (22) Date of filing: 14.04.2021 (51) ..., there is still a need for convenient and cost-efficient energy storage systems. That is because ...

An underwater energy storage system comprising a container where energy is stored by transporting water between the container and a body of water, is disclosed. 5 The container ...

Underwater compressed air energy storage (UWCAES) in deep seas is a promising scenario for energy storage. ... O. Laing, J.L.N. Laing, 1989. Energy storage for off peak electricity, USA Patent US4873828. Google Scholar [3] A. Pimm, S. Garvey, R.J. Drew. ... Wind powered pumped hydro storage systems, a means of increasing the penetration of ...

Primary batteries are not rechargeable and are still used for a variety of several applications (such as underwater vehicles power supply) although secondary batteries are preferred for reasons of cost and ease of use. ... FCT developed kinds of high endurance Aluminum Energy (AE) semi-fuel cell systems for various underwater applications [44 ...

The most investigated technology is based on Compressed Air Energy Storage (CAES) systems [5], [6], ... exist since the empty box is subjected to very high pressure and must be built in accordance with suitable structural requirements. ... Underwater energy storage through application of Archimedes principle. J. Energy Storage, 8 ...

energy Prior art date 2012-11-07 Legal status (The legal status is an assumption and is not a legal conclusion. Google has not performed a legal analysis and makes no representation as to the accuracy of the status listed.) Expired - Fee Related Application number JP2015540919A Other languages Japanese (ja) Other versions

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