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# ENERGÍAS MARINAS

Boletín 4º trimestre 2015

Vigilancia Tecnológica

## Introducción

NIPO: 073-15-034-9

Las Energías Renovables Marinas constituyen en el presente uno de los conjuntos de fuentes energéticas que, poseyendo un ingente potencial, su explotación se encuentra mínimamente desarrollada. Su origen está constituido por el carácter de inmenso colector de energía que conforman los mares y océanos, que ocupando alrededor del 70% de la superficie del planeta y almacenando sobre $1.500*10^9$ $m^3$ de agua, son la mayor reserva energética existente en la tierra y además de carácter renovable. Las Energías Renovables Marinas más relevantes en la actualidad podríamos clasificarlas en energía de las Olas (undimotríz), energía de las Mareas (mareomotriz). Otras fuentes a considerar también en el medio marino son la energía eólica (offshore), la energía de las corrientes marinas (inerciales) y el gradiente térmico oceánico (OTEC). La Península Ibérica cuenta con una ubicación privilegiada para el aprovechamiento de estas energías lo que constituye una sinergia que no se debe dejar pasar por los agentes institucionales entre cuyos objetivos está proteger e impulsar la innovación y el desarrollo industrial y económico de los países ibéricos, concretamente, las autoridades nacionales en materia de propiedad industrial de Portugal y España.

Este Boletín de Vigilancia Tecnológica (BVT) es el resultado de la colaboración hispano-lusa entre la Oficina Española de Patentes y Marcas (OEPM) y el Instituto Nacional de Propiedad Industrial de Portugal (INPI), y tiene como objetivo proporcionar el seguimiento trimestral de las últimas novedades y publicaciones de Solicitudes de Patente Internacionales (Patent Cooperation Treaty PCT) en el campo técnico de las Energías Marinas.

En este duodécimo BVT se presenta la estadística de 2015 por país de prioridad, por inventores, solicitantes y clasificaciones de las Solicitudes Internacionales PCT. Están seleccionadas sobre la base de la Clasificación Internacional de Patentes (IPC) y la Clasificación Cooperativa de Patentes (CPC) identificadas con el código F03B13/12 con los que se clasifican a nivel internacional las energías marinas, fundamentalmente las energías mareomotriz y undimotríz. También se presentan noticias en este campo técnico en el ámbito peninsular así como una crónica de la jornada sobre el Estado Actual y Perspectivas de las Energías Renovables Marinas en España celebrada en Madrid el 24 de noviembre de 2015.

Este Boletín se publica en portugués y en castellano en las correspondientes páginas web de ambas Oficinas Nacionales.

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## Energía Mareomotriz

Las mareas son una fuente renovable de energía absolutamente predecible cuyo aprovechamiento conlleva grandes retos técnicos y cuyo desarrollo comparado con otros aprovechamientos renovables es claramente incipiente. La Península Ibérica posee una costa apta para el aprovechamiento de la energía mareomotriz y las invenciones en este campo técnico son el medio para optimizar aprovechamiento minimizando al mismo tiempo el impacto ambiental y los costes económicos. A continuación, las publicaciones de solicitudes internacionales PCT en este campo técnico.

| # | Publicación | Solicitante | Resumen |
|---|---|---|---|
| 1 | WO 2015123738 Late EPODOC publication | CARVALHO CRUZ EULER | An apparatus for extracting energy from moving fluids, such as winds, sea currents, tides or rivers, comprising a fixed base or tower and a rotary hub-like component mounted on the tower and provided with inclined airfoiled or hydrofolied blades extending outwards from said rotary hub, or in the form of horizontal or inclined arms linked to said rotary hub; each blade contains articulation points and can pivot about an articulation line so as to vary its inclination angle, the variation in inclination being controlled or carried out by mechanical actuators. |
| 2 | WO 2015144805 | SKF AB | The invention relates to an underwater turbine for generating energy by means of water flow comprising a hub, a turbine blade, and a bearing assembly for rotatably supporting a turbine blade on a turbine hub. The turbine blade is rotatably connected to the hub by means of the bearing assembly. The bearing assembly comprises a double-row tapered roller bearing . The tapered roller bearing has a set of internal teeth for connecting a drive for rotating the turbine blade, which set of internal teeth is connected to an inner bearing ring of the tapered roller bearing in a rotationally fixed manner. |
| 3 | WO 2015152807 | SKF AB | The present invention is based on the idea to utilize forces arising from predictable tidal water flows changing direction every six hours. The present invention relates to a submerged system for converting a tidal water flow to electrical energy comprising a load-carrying module, an electrical generating module comprising a generator and being operatively connected to the load- carrying module and a transmission unit allowing rotational motion about the central axis of the load-carrying module to be transmitted to rotational motion about the axis of the electrical generating module being parallel to the central axis. |
| 4 | WO 2015152645 | KIM JI-WAN<br>KIM SUNG-CHUL | The present invention provides a turbine for tidal power generation which is improved so as to be rotated in only one direction even when a water flow is changed, thereby enabling continuous power generation. The turbine has movable wings that are oriented by the water flow in order to catch the water motion from any direction.The purpose of the present invention is to enable power generation without changing the natural ecosystem. |

| # | Publicación | Solicitante | Resumen |
|---|---|---|---|
| 5 | WO 2015155249 | ZAG TECHNOLOGIES | An electromagnetic generator for generating electricity comprising: an exciter having a first magnetic flux, an electrical conductor operable to generate a second magnetic flux when moved relative to the first magnetic flux, means for causing relative motion between the first magnetic flux and the conductor such that the second magnetic flux generated at the conductor opposes the motion of the first magnetic flux relative to the conductor to simultaneously generate an electromotive force (EMF) and a potential energy that is stored in the second magnetic flux. Applicable to specifically designed to harness energy from the displacement and vast tonnages of the tidal waters. |
| 6 | WO 2015173765 | TOR H2 S R L | A plant for converting the kinetic energy deriving from the movements of a water source due to the action of the tides, in such a way as to increase the potential head of the turbines for hydroelectric conversion and also comprising a photovoltaic apparatus to pump the water to an upper reservoir from where water is returned to the upper level. |
| 7 | WO 2015173535 | OCEAN CURRENT ENERGY LLC | A bridge over the water that supports a base that supports a plurality of electrical generators which operate to generate electricity consequent upon receiving the flowing water with connection means and an electricity sub-station. The base is positioned adjacent the bridge supports and operates independently of the bridge supports in order to avoid compromising the structural integrity and operation of the bridge. |
| 8 | WO 2015174706 | SHIN DONG RYUN | Power generation unit comprising a water wheel and a power generator; and a body part provided with tidal current inlet and outlet paths having a cross-sectional area that is gradually reduced from the front and rear surfaces thereof toward the water wheel. A plurality of floating bodies for tidal current power generation are disposed in parallel so that the longitudinal direction of the tidal current inlet and outlet paths coincides with the direction of the tidal current in a terrain such as a strait with a narrow width. Additionally, a method for adjusting the draft of a floating body depending on the flow velocity of the current to smoothly perform power generation even when the flow velocity becomes slower. |
| 9 | WO 2015176956 | VOITH PATENT GMBH | The invention relates to a method for operating a bidirectional tidal power plant. The tidal power plant has the following features: a dam which separates a part of the sea from the open sea and thus encloses a reservoir, at least one turbine, at least one sluice gate, and at least one pump or the possibility of operating at least one turbine as a pump, using the method mentioned above. |

| # | Publicación | Solicitante | Resumen |
|---|---|---|---|
| 10 | WO 2015185913 | TIDAL GENERATION LTD | A clamp arrangement comprises a clamp member which defines a bearing surface, an actuation point and actuation axis which extends through the actuation point. The clamp member is attached to a mounting portion and is rotatable relative to the mounting portion about a first axis substantially perpendicular to the actuation axis. An actuation ring is arranged for rotation relative to the mounting portion about a second axis substantially parallel to the actuation axis of the clamp member. A resilient member is attached between the actuation ring and the actuation point of the clamp member. An actuator is provided which is operable to act on the actuation ring. |

## Energía Undimotriz

Las olas de los mares y océanos son una fuente renovable de energía con un alto potencial para las costas atlánticas. Que ya en el siglo XVIII se propusieran invenciones para aprovechar la energía de las olas no le resta perspectiva a las diversas tecnologías que hoy en día se proponen para instalaciones tanto en tierra como en estructuras flotantes. Las invenciones en este campo técnico plantean cada vez mayores rendimientos en el aprovechamiento de la energía undimotriz y un mayor respeto al medio ambiente marino. A continuación, las publicaciones de solicitudes internacionales PCT en este campo técnico.

| # | Publicación | Solicitante | Resumen |
|---|---|---|---|
| 1 | WO 2015144956 | ABENGOA SEAPOWER S A (Spanish inventors) | Device for generating electricity from wave energy comprising a floating body with an internal space containing an inertial mass connected to a power extraction system and an anchoring device, in which the external face of the stern of the floating body has a convex shape in the form of the surface of a first transverse rectangular cylinder segment that extends between opposing sides of the stern, while the external face of the bow of same has a convex shape in the form of the surface of a second transverse rectangular cylinder segment that extends between opposing sides of the bow, the external face of the stern extending along a first arc (α) of at least 180 DEG and the external face of the bow extending along a second arc (β) of no more than 90 DEG. |
| 2 | WO 2015153061 | PATEL ROHAN | The apparatus includes a buoyant platform and a plurality of wave-energy capturing (WEC) units. The buoyant platform stays afloat upon the ocean surface. The WEC units are peripherally distributed about the buoyant platform, which allows the apparatus to collect to the kinetic energy from incoming ocean waves from any direction. Each WEC unit includes a cam mechanism, a recoiling mechanism, a cable, an anchor, a pinion, a transmission, and a generator. The cam mechanism converts the linear motion of the buoyant platform into rotational motion, which is fed into the pinion, through the transmission, and into the generator. The recoiling mechanism returns the cam mechanism to its equilibrium position. Each WEC unit is secured to the seabed through the anchor and the cable |
| 3 | WO 2015149806 | FAATEK APS | The present invention relates to hydraulic wave energy converters comprising a gas controlled hydraulic accumulator assembly, enabling a stepless power regulation of the hydraulically driven power generator with a relatively small power loss. |
| 4 | WO 2015150102 | IFP ENERGIES NOUVELLES | The aim of the invention is to improve the operation of a wave energy converter system, by means of a method for the predictive control of the converter machine which maximises the power generated by taking into account the efficiency of the energy conversions and the prediction of the swell. |

| # | Publicación | Solicitante | Resumen |
|---|---|---|---|
| 5 | WO 2015150602 | ELABORADOS CASTELLANO S L (Spanish inventors) | The invention relates to a device for generating energy by making use of the movements of sea waves, said device comprising a central shaft, a first mechanism and a second mechanism, wherein the first mechanism has at least one first float joined to the central shaft by a first joining shaft, at least one second float joined to the central shaft by a second joining shaft, and a system for locking and releasing said joining shafts in relation to the central shaft, such that the first joining shaft is joined to the central shaft by a first clamp, and the second joining shaft is joined to the central shaft by a second clamp, and the second mechanism has at least two tubes coiled in a helical shape around the central shaft. |
| 6 | WO 2015150194 | GROSSMANN HANS | Archimedean screws in horizontal or inclined position convert kinetic sea wave energy into electricity. A current generator is directly or indirectly driven by the rotational axis of the screws. The screws have a protection device and are attached to foundations that can belong to offshore platforms. |
| 7 | WO 2015152843 | MEHMETOGLU NECDET SUAT | Wave energy generator has a floating object moved up and down by waves motion. A main shaft at the center of each rotating section enables the rotating section to remain stable where it is positioned. A parallel system transfers motion when the main shaft rotates in one direction. A transfer shaft centered on a second rotating section rotates continuously in the same direction as the main shaft enabling energy collection and electric power generation. |
| 8 | WO 2015157528 | BRIMES ENERGY INC | A wave energy conversion system is provided including a pod, multi-radius energy transmission mechanism, and an electrical generating device. The pod is rotatably supported by a platform structure and the multi-radius energy transmission mechanism is in mechanical communication with the pod. The multi-radius energy transmission mechanism is configured to transmit a variable torque over a range of motion and is in mechanical communication with the electrical generating device. |
| 9 | WO 2015158354 | ABDELHAMID ADEL HUSSEIN | The invention relates to a device comprising a reel around which a cable is wound. One end of the cable is tied to a floating body (buoy) and the other end is connected to a spring or ballast, or to both. The reel is attached to a shaft that acts as the axle, which is rotated by the reel. The axle is connected at both ends to two electricity generators by a special connector. All of the components are attached to a base that floats on the surface of the water and that is tied to the seabed or to suitable ballast (or similar). When the buoy rises under the effect of an incoming wave, pulling the cable, which makes the reel rotate, and also when the buoy descends under the effect of the spring or the counter ballast, the special connector rotates the generator, thereby generating energy. |

| # | Publicación | Solicitante | Resumen |
|---|---|---|---|
| 10 | WO 2015158773 | HAAHEIM INVENT | The present invention relates to a wave energy conversion apparatus for converting wave energy into a power output, comprising a floatable compliant vessel having a plurality of linear generators having ends which are interconnected at a plurality of pivot joints to provide a compliant frame structure, the plurality of linear generators being configured to produce a power output by being respectively compressed and elongated changing the relative positions of the pivot joints, an outer flexible membrane supported by and enclosing the compliant frame structure thereby defining an inner space of the floatable compliant vessel, and a power circuit arranged within the inner space and operationally connected to the linear generators to receive the power output generated by the linear generators. |
| 11 | WO 2015163641 | UNIV ULSAN FOUND FOR IND COOP | The present invention relates to a sliding-type wave power generator comprising: a hydraulic pressure generating device for generating a hydraulic pressure of an internal fluid by means of piston up/down movements of a cylinder using the potential energy of waves; a hydraulic pressure control system for removing fluctuation of the hydraulic pressure, storing preliminary energy, and thereby replenishing a driving pressure of an hydraulic motor; and a power generation unit for receiving the driving pressure of the hydraulic motor and, from a microprocessor, a driving current of the hydraulic motor, thereby generating electric power using a generator by means of rotations of the hydraulic motor. |
| 12 | WO 2015173235 | SENER ING & SIST (Spanish inventors) | A device (OWC Oscillating Water Column) for capturing wave energy, the upper part of which contains a pressure accumulator connected to the atmosphere through a unidirectional outlet turbine and a vacuum accumulator connected to the atmosphere through a unidirectional inlet turbine. The lower portion is formed by at least one block, where each block is made up of a structural column, which when submerged in the water gives rise to a water column and an air chamber in the upper portion. Each block is connected to the pressure accumulator through a non-return intake valve, and to the vacuum accumulator through a non-return exhaust valve, and having an inlet arranged in the lower portion of each structural column. One of the main characteristics of the device is that the pressure and vacuum accumulators act as an air manifold, inhaling and exhaling through the blocks, and at the same time damping sudden changes in pressure. |
| 13 | WO 2015172272 | CHEN WENBIN | Multi-buoy link power generating equipment comprises a buoy system, a connecting rod system and a torque converting system. The buoy system is a rectangular buoy with circular angle. Universal joints and hydraulic device rods are installed on the lateral side of the buoy system. The torque converting system is installed within or above the buoy system. Two adjacent buoys are connected through a connecting rod by the universal joint. The buoy moves vertically along with waves to drive the connecting rods to generate torque and the torque conversion system converts the torque into electric power. |

| # | Publicación | Solicitante | Resumen |
|---|---|---|---|
| 14 | WO 2015174727 | KOREA MARITIME UNIVERSITY INDUSTRY ACADEMIC COOPERATOIN FOUNDATION | The present invention relates to a floating wave power generator using a cross-flow turbine and, more particularly, to a floating wave power generator using a cross-flow turbine, capable of generating electric power by operating the turbine using rolling motion generated by waves. The floating wave power generator using a cross-flow turbine according to the present invention comprises: a floating body, which is provided with a space therein, and the front and rear of the exterior of which are in the form of a flat hull, and which floats on the sea; a case comprising first and second case parts which are provided apart from one another on either inner side of the floating body and have a fluid accommodated therein; a fluid communication tube, which is provided as a tube extending from the lower parts of the sides, which face one another, of the first and second case parts and communicating therewith, and through which the fluid flows; a cross-flow turbine installed on one inner side of the fluid communication tube so as to rotate according to the flow of the fluid through the fluid communication tube; a generator provided inside the floating body, for generating electric power by receiving the power of the cross-flow turbine; and an air communication tube, which is provided as a tube extending from the upper parts of the sides. |
| 15 | WO 2015174267 | KAYABA INDUSTRY CO LTD | Energy of waves converter into water-wheel rotational energy. This wave power generation device is provided with: a pair of water wheels that have a pair of rotational shaft sections which sandwich a virtual first plane that expands and includes two central lines extending in the longitudinal direction in each of two end openings, opening in a rectangular shape, of a slit section provided to a wall body to be at least partially arranged in water, and which extend parallel to each of the central lines, and that have a rotary wing section, the water wheels having different directions of rotation about the respective rotational shaft sections; and a power generator converting the rotational energy of the water wheels. |
| 16 | WO 2015175535 | OCEANA ENERGY COMPANY | A hydroelectric turbine may include a stator comprising an electricity generating portion having coils and a rotor supported relative to the stator and configured to rotate relative to the stator about an axis of rotation. The turbine may also include a plurality of magnets arranged so as to generate electricity in the coils as the rotor rotates relative to the stator. The turbine may further include a plurality of first blade portions and second blade portions supported on the rotor. Each first blade portion may be radially outside of a circumference of the rotor and each second blade portion may be radially within the circumference of the rotor. Each blade portion may be angled in a tangential direction and angled downstream in an axial direction. |

| # | Publicación | Solicitante | Resumen |
|---|---|---|---|
| 17 | WO 2015176345 | UNIV SOUTH CHINA TECH | A vertical shaft wave generator comprises blades, a rotating shaft, a support pillar, an above-water platform exposed avove the sea level, a generator body, a blade height lifting device, and a control device and a base arranged on the above-water platform. The blades are fixed to the rotating shaft in the circumferential direction. The inside of the rotating shaft is sleeved at the upper end of the support pillar through a bearing. The lower end of the support pillar is fixedly connected with the base. The above-water platform is fixed to the upper end of the support pillar. The on-the-sea arrangement of the generator is independent of waves direction . The blades drive the rotating shaft so as to generate electricity. |
| 18 | WO 2015177400 | AW ENERGY OY | Wave energy recovery apparatus comprising at least a base, a reciprocating panel, supporting legs and a pivot shaft for the reciprocating panel, and a driving and power-take-off (PTO) arrangement equipped with an actuating mechanism and one or more PTO units to convert kinetic energy of waves or tidal currents to another type of energy. The actuating mechanism is arranged to transfer the reciprocating motion of the panel mechanically to a linear motion of the power transmission mechanism of each PTO unit. |
| 19 | WO 2015181357 | SENER ING & SIST (Spanish inventors) | Air turbine for oscillating water column devices, with a design that may be used in both axial and radial configurations. The turbine comprises an outer cover, an inner casing, a stator and a rotor that is coupled to the corresponding generator. The stator is provided with guide vanes having a variable pitch that is modified by a semi-active actuation system that incorporates an actuator and a spring with a controllable rigidity and/or a damper with controllable dampening. This system enables the turbine to adapt to the different flow conditions, sea conditions or operation modes, thus obtaining maximum performance at all times. |
| 20 | WO 2015181402 | ANASTASI RIBALTA FRANCISCO (Spanish inventors) | A drive shaft supported by pillars that consist of a lower vertical segment secured to the sea bed, and an upper segment, moveable in relation to the lower segment. The device comprises rack-and-pinion mechanisms for regulating the height of the upper segment in relation to the lower segment of the pillars. The pinions are attached to a horizontal shaft mounted on the lower segment of the pillars and is actuated by a motor, and the racks are meshed with said pinions and attached to the respective upper segments of the corresponding pillars. |
| 21 | WO 2015185543 | DOLEH ZAKARIA KHALIL IBRAHIM; LOCK JOHN DOUGLAS | A shutter valve for alternatingly allowing and stopping a high pressure water flow, such as in a device for generating energy from sea waves, comprising a tube section having a rectangular cross section, wherein a multitude of vanes are rotatably mounted in the tube section, characterized in that the distances between the axes of adjacent vanes are approximately half the distance between the outer tips of the vanes, such that when the vanes are rotated to the closed position form a single closed front surface and a single closed back surface, each in substantially a single flat plane perpendicular to the flow axis of the valve, said surfaces closing the opening of said tube section. |

| # | Publicación | Solicitante | Resumen |
|---|---|---|---|
| 22 | WO 2015186996 | AKDI MAHMOUD; SEDRA MOULAY BRAHIM | The mechanism for producing electrical energy using the motive power of the waves generated by the wind at dams is made up of a fixed central post to which a circular ring is fitted coaxially. This ring accepts a rotor/shaft the second end of which on the other hand is fixed to a floating barge of hydrodynamic shape which self-orientates in the direction of the waves. This shaft supports the blade assemblies/stators turned by the impact with the waves thereby producing electrical energy. The mobile assembly thus defined has two degrees of freedom, namely rotation about the axis of the post then oriented by the direction given by the barge, and translational movement with respect to the horizontal plane, according to the water level. |
| 23 | WO 2015187006 | EMID SOEMAR | Wind energy conversion combined with a wave energy converter, which is a breakwater against tsunami and storms, suitable to harness the energy of powerful winds and waves, while protecting coastal regions. A Wind Accelerated Turbo Turbine runs a water pump for the wave converter or an electricity generator. The engine is self starting, has low wind cut-in, wind speed regulation with wind brake and shut down. The engine runs also on water and is suitable for low currents, free running on buoyancy adjusted turbines, including built-in generators. |
| 24 | WO 2015190297 | UNIV OSAKA CITY; KYB CORP | Wave-activated power generation system is used with a seawall, dissipates the energy of waves, and generates power, contains a rotating-body row and a generator. The seawall is disposed in the water has an impermeable wall but does not have a permeable front-wall on the offshore side of the impermeable wall. The rotating-body row consists of a plurality of rotating bodies which are, on the offshore side of the impermeable wall, arranged along the direction of extension of the impermeable wall in plan view. The generator converts the rotation energy of the plurality of rotating bodies into electrical power. |

## Energías oceánicas diversas

En esta sección figuran las solicitudes internacionales PCT que se refieren a tecnologías que pueden aplicarse tanto a la energía de las olas como de las mareas.

| # | Publicación | Solicitante | Resumen |
|---|---|---|---|
| 1 | WO 2015179520 | MEGGITT DALLAS | A platform configured to be buoyant and submerged in the deep water. A tethering system is attached to the platform and further attached to the sea floor. The tethering system holds the platform at an intermediate depth of water between the surface and the sea floor. Surface equipment is attached to the platform and configured to perform a function normally performed on a surface of shallow water. |
| 2 | WO 2015187742 | CALIFORNIA INST OF TECHN | Buoyant sensor networks are described, comprising floating buoys with sensors and energy harvesting capabilities. The buoys can control their buoyancy and motion, and can organize communication in a distributed fashion. Some buoys may have tethered underwater vehicles with a smart spooling system that allows the vehicles to dive deep underwater while remaining in communication and connection with the buoys. |
| 3 | WO 2015187028 | STIFTELSEN RENEWABLES | Vertically oriented power modules and associated module bone, together with intermediate flap turbines and turbine cores. The primary energy conversion takes place by means of the horizontal lines and concentric flap turbines having movable and elastic axially riser or radial lines flaps attached to the turbine sleeve, turbine surfaces or pendulum arms. Flap turbines maintain the direction of rotation undependent of alternating ocean motions. Further transformation of energy takes place inside the power plant modules or flap turbines having direct induction. The elastic flaps can alternately be included in the storage of kinetic ocean energy as potential energy. The power plant utilizes the kinetic ocean energy of water mass motion and increases level of energy between power modules. The power plant further comprises an articulated and flexible tide and storm surge tether means for controllable energy compression and wave reflective flow wall. |
| 4 | WO 2015186086 | COS B I COSTRUZIONE BOBINE ITALIA S R L | A turbine comprising a rotor assembly having a rotation axis x and comprising a number m of modules adjacent to each other and aligned to each other. Each module comprises a number n of blades parallel to the rotation axis x and arranged about its rotation axis x with a predetermined angular range Θ, said rotor assembly arranged to rotate, in use, about its rotation axis x when the blades are immersed in a water flow. The hydroelectric turbine also comprises a support structure arranged to support the rotor and an electric power generator operatively connected to the rotor assembly. The support structure is configured to keep the rotation axis x, in use, in a position substantially orthogonal to the water flow. |

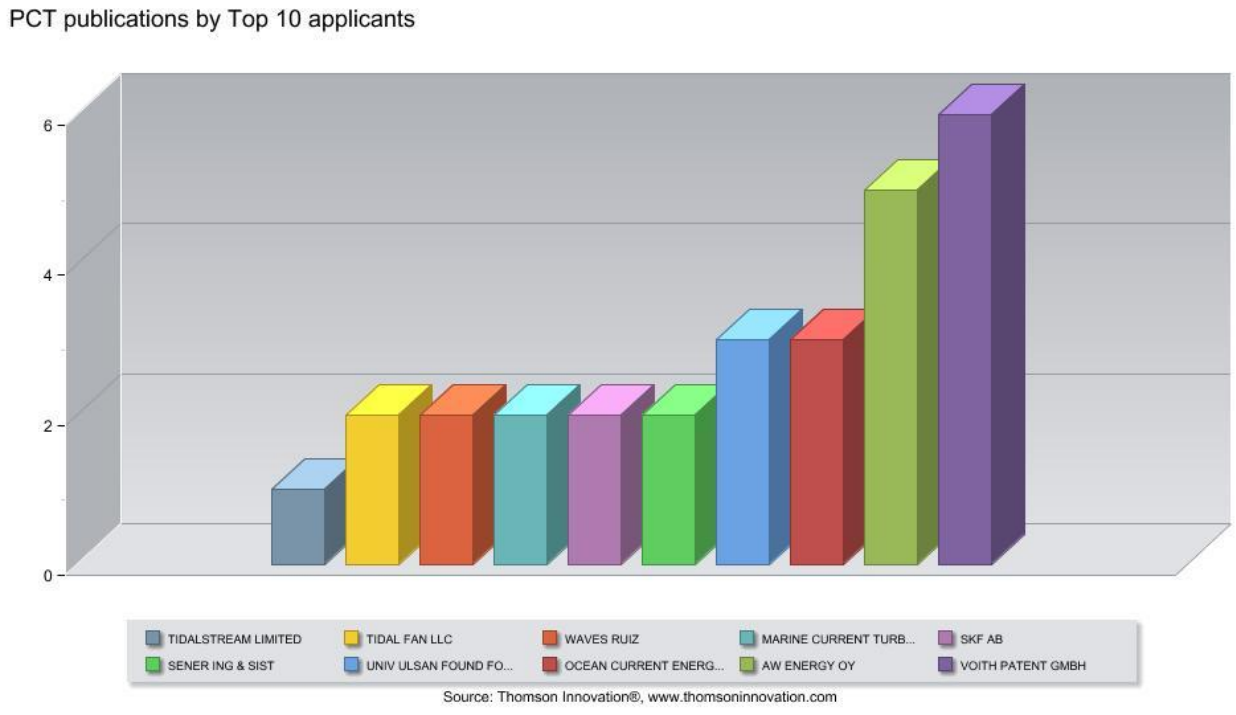
# ESTADÍSTICAS

Las estadísticas de este BVT están centradas en las publicaciones PCT relativas a la energía de las olas y de las mareas, del año 2015.

Se presentan datos estadísticos relativos a las Publicaciones PCT (1) de los 10 solicitantes más frecuentes, (2) de los 10 inventores más frecuentes, (3) de los 10 países prioritarios más frecuentes, así como (4) de las 10 clasificaciones IPC más frecuentes.

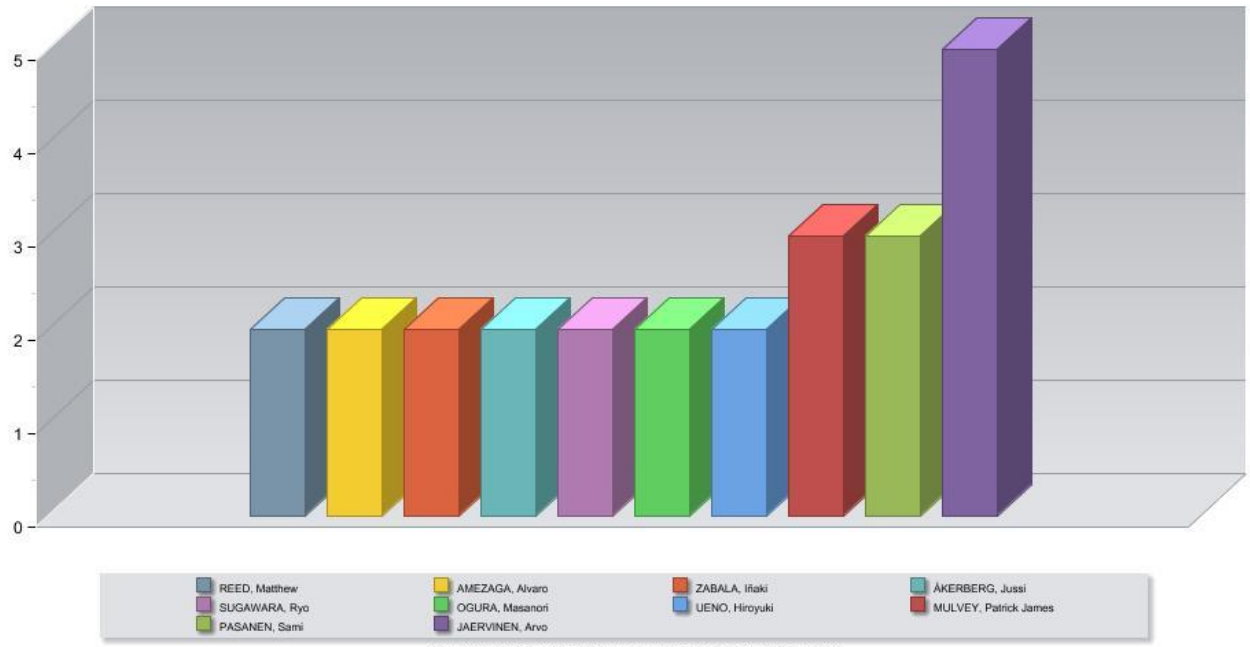
La herramienta utilizada para la producción de estos gráficos (Thomson Innovation) utiliza la clasificación principal de cada publicación. Se observa que en la gráfica relativa a las clasificaciones IPC más frecuentes además de la clasificación más general F03B13/12, que engloba a las energías undimotriz y maeromotriz también se presentan las clasificaciones de áreas técnicas cercanas y, concretamente , las clasificaciones jerárquicamente inferiores que son específicas para las olas y las mareas.

## 1.- Publicaciones PCT en 2015 de los 10 solicitantes más frecuentes. 9



## 2.- Publicaciones PCT en 2015 de los 10 inventores más frecuentes.

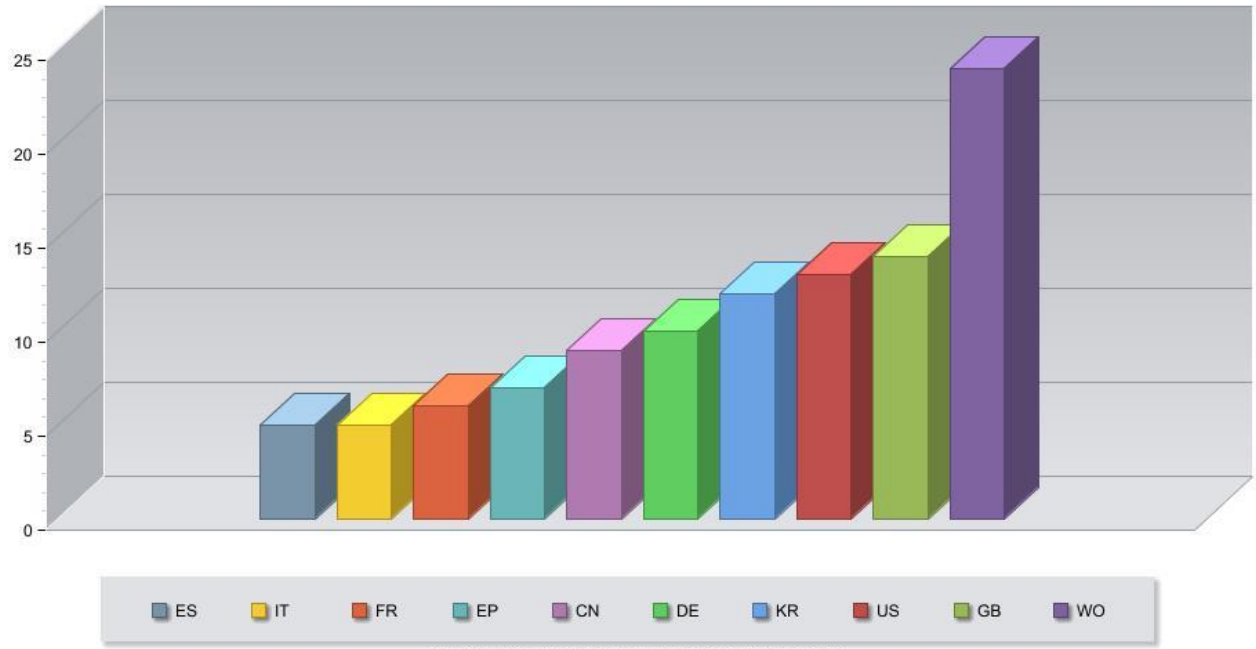
PCT publications by Top 10 inventors




Source: Thomson Innovation®, www.thomsoninnovation.com

## 3.- Publicaciones PCT en 2015 de los 10 países de prioridad más frecuentes. 10

PCT publications by Top 10 priority country

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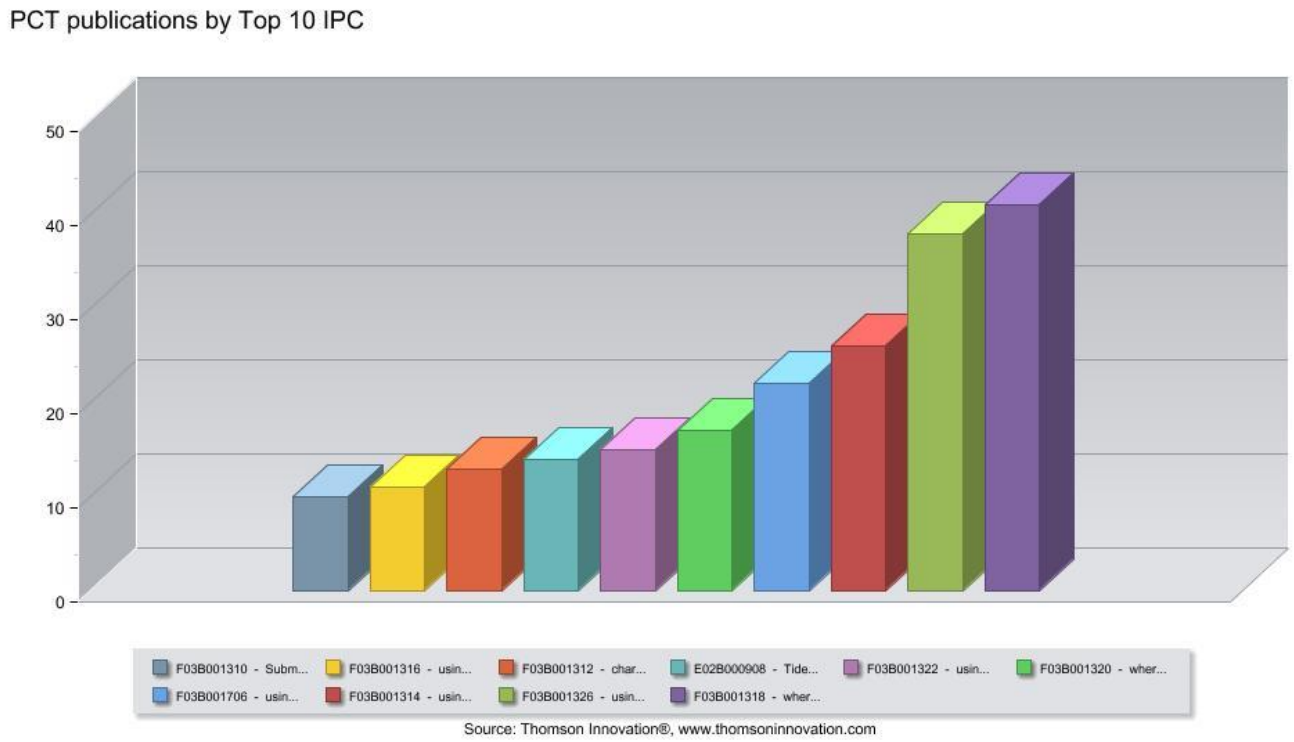
## 4.- Publicaciones PCT en 2015 de las 10 clasificaciones IPC más frecuentes.

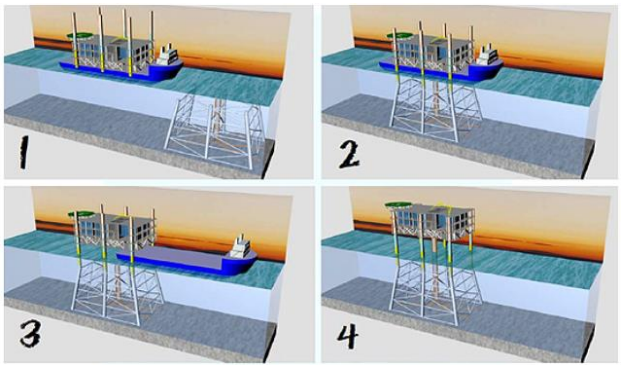



F03B 13/12· characterised by using wave or tide energy
F03B 13/14· using wave energy [4]
F03B 13/16· using the relative movement between a wave-operated member and another member [4]
F03B 13/18· wherein the other member is fixed, at least at one point, with respect to the sea bed or shore [4]
F03B 13/20· wherein both members are movable relative to the sea bed or shore [4]
F03B 13/22· using the flow of water resulting from wave movements, e.g. to drive a hydraulic motor or turbine [4]
F03B 13/24· to produce a flow of air, e.g. to drive an air turbine [4]
F03B 13/26· using tide energy [4]

# Noticias del sector

## Iberdrola y La Naval apuestan por subestaciones 'offshore' autoinstalables

Iberdrola lidera, junto con los astilleros vascos La Naval y el centro tecnológico Tecnalia, un proyecto de investigación que busca diseñar y desarrollar una subestación eléctrica 'autoinstalable' para parques eólicos marinos (offshore), lo que permitirá una importante reducción de costes en la construcción de estas infraestructuras energéticas.




Se trata de un proyecto de gran relevancia, ya que sólo la fase de 'diseño conceptual' conlleva una inversión de casi 10 millones, en cuya financiación participa el Gobierno vasco con el programa Etorgai. El proyecto 'Marin-el', según explica Ignacio Pantojo, responsable de proyectos de energía marina en Iberdrola Ingeniería y coordinador de Marin-el, puede suponer un fuerte impulso en el negocio 'off shore' para la industria vasca de componentes eléctricos y prueba de ello es la implicación directa de los grupos Ingeteam, Arteche, Ormazabal (Velatia), Oasa Transformadores y Semantic Systems, trabajando conjuntamente con los centros tecnológicos Tecnalia, CTDE, la Universidad del País Vasco (UPV) y los centros de innovación de Ormazabal y Arteche.

Fuente: elEconomista.es

Fecha: 21/12/2015

## EUROPA – Apuesta pendiente en Renovables

Discutir sobre las energías renovables marinas fué el objetivo de Seminario 2015 de WavEC que tuvo lugar el 16 de noviembre en la Fundación Gulbenkian de Lisboa

El Seminario promovido por WavEC - Offshore Renewables en la Fundación Gulbenkian, genericamente titulado, "Portugal y Francia: Una fuerza conductora en Investigación e Innovación de las Energías Renovables Marinas" estaba destinado especialmente a mostrar los proyectos en curso y su madurez, así como las empresas (también portuguesas) que participan y su importancia en la internacionalización y su impacto en la sociedad.

El proyecto WindFloat, liderado por EDP, es uno de los que están más adelantados en pruebas. Basado en la tecnología eólica flotante pronto entrará, según Pedro Valverde, de EDP, en la fase previa de la comercialización - la fecha límite es 2017, con la venta al año siguiente.


Patrik Möller, de Corpower, introdujo otra tecnología: las olas. Sobre la base de los ensayos en la costa escocesa, el ejecutivo advirtió, sin embargo, de la necesidad de construir un equipo que pueda soportar las tormentas más fuertes y al mismo tiempo proporcionar energía suficiente para justificar la inversión.

João Costeira, EDPR, reflexionó sobre los resultados de la compañía. De 2008 a 2014, la producción de energía aumentó en un 17% y en este momento EDPR es el cuarto mayor productor de energía eólica (el primer es Iberdrola, seguido de Nextera y Longyuan).

José de Sousa Ventura, de la Asociación de Industrias de Marina, presentó los fundamentos del mercado. De acuerdo con la

Asociación Europea de Energía Eólica (EWEA), la primera mitad de 2015, Europa conectó a 584 turbinas eólicas en alta mar, con la generación de 2,342.9 MW. Hay 15 parques eólicos en construcción que aumentarán la capacidad hasta 4,268.5 MW . Sin embargo, EWEA estima que para el año 2030, la tecnología eólica marina puede producir 150 GW, lo que representa el 14% del consumo europeo de electricidad.

Jacopo Moccia, de la Ocean Energy Europe, puso el "dedo en la llaga", recordando que Europa depende el 53% de las importaciones de energía. Son alrededor de 400 mil millones de € anuales. Algo así como "el PIB de Bélgica", comentó. Y eso es lo que se quiere cambiar. El nuevo concepto de "Unión de Energía" pretende ser un líder a nivel mundial en energías renovables y lograr que todos los países de la Unión Europea sean entre 85 a 90% libre de carbono el año 2050. Sin embargo, para lograr este objetivo, alerta Jacopo Moccia, será necesario buscar la energía renovable "en todas partes", y no sólo en grandes proyectos. "Y aquí la energía marina jugará un papel importante", y la cuantía de la inversión es fundamental.

Una nota positiva. Estas tecnologías suponen más y nuevos negocios para industrias como la metalúrgica. Porque las plataformas, turbinas, barcos, todo tendrá que ser construido. Pero esto, también implica nuevas necesidades de formación de los recursos humanos.

Fuente Jornal de Economia Marítima - Diciembre 2015, edición n.º17, Dossier Especial – Energia.
http://www.jornaldaeconomiadomar.com/

Fecha: Diciembre 2015

## Gibraltar tendrá una central de aprovechamiento de la energía de las olas

La empresa Eco Wave Power (EWP) acaba de anunciar que ha recibido una subvención de la Unión Europea para impulsar un proyecto de central de aprovechamiento de la energía de las olas en Gibraltar. Según el comunicado difundido por la empresa, la instalación -que será ejecutada en dos fases- tendrá cinco megavatios de potencia y va a suministrar energía al peñón en el marco de un acuerdo de compra venta de electricidad suscrito entre EWP, Gibelec y el Ministro de Medio Ambiente, Energía y Cambio Climático de Gibraltar, John Cortes.

La primera fase de la obra consistirá -informa EWP- en implementar una estación de cien kilovatios en el Muelle Ammunition. La segunda y última concluirá con la instalación de aprovechamiento de la energía de las olas propiamente dicha, que tendrá cinco megavatios de potencia (5 MW) y que EWP prevé sea capaz de abastecer más del 15% de la demanda gibraltareña.

Fuente : Energías Renovables

Fecha: 11/12/2015

# Crónica de la

## Jornada sobre el Estado Actual y Perspectivas de las Energías Renovables Marinas en España.

El 24 de noviembre pasado la OEPM fue invitada a participar en una jornada sobre el Estado Actual de las Energías Renovables Marinas (ERRMM) que contó con una nutrida y selecta asistencia en el salón de actos de la Escuela Técnica Superior de Ingenieros Navales (ETSIN) de la Universidad Politécnica de Madrid.


La jornada fue inaugurada por **D. Luis Ramón Núñez Rivas**, Director de la ETSIN junto con **D. Federico Esteve Jaquotot**, Presidente de Honor del Cluster Marítimo Español y **D. José Manuel Revuelta Lapique**, Presidente de la empresa pública española NAVANTIA.

Con esta jornada se consiguió reunir desde la Plataforma Tecnológica Marítima Española PTME y la Sección Marina de la Asociación de Empresas de Energías Renovables (APPA Marina) las voces de los principales actores en las EERRMM del Estado Español.

Comenzó la jornada con una primera sesión de posicionamiento de la industria española en el sector. La OEPM ofreció una visión de la evolución temporal de las patentes más relevantes en este campo técnico lo que fue seguido por la presentación de los desarrollos de varias de las empresas destacadas: WEDGE GLOBAL mostró la situación actual de su desarrollo de captación de energía undimotriz; OCEANTEC presentó un absolvedor puntual basado en OWC; ENEROCEAN mostró la situación actual de su plataforma híbrida W2POWER; SOERMAR informó sobre las oportunidades de las EERRMM para los astilleros privados y su proyecto PROCODAC; finalmente ADWEN mostró los avances en eólica marina. Las anteriores presentaciones mostraron como no son actuaciones singulares las existentes en el sector sino que hay un posicionamiento que de forma creciente se muestra cada vez más avanzado y generalizado.


Siguió la jornada mostrando los principales centros de investigación y experimentación existentes en el Estado y sus instalaciones y capacidades. Comenzó el Centro de Experiencias Hidrodinámicas de El Pardo, CEHIPAR seguido por el Instituto de Hidráulica Ambiental de Cantabria IHC que mostró su aportación a la reducción de riesgos en el I+D+i. Siguieron las actividades del grupo de investigación GIT-ERM de la Universidad Politécnica de Madrid. Cerraron las sesión las presentaciones de las dos plataformas marinas existentes en el Estado y que son de reconocida solvencia a nivel internacional comenzando por la Plataforma Oceánica de Canarias PLOCAN seguida de la Biscay Marine Energy Platform bimep, clara apuesta del gobierno Vasco en el desarrollo de las EERRMM. En esta sesión se constató cómo la I+D+i española en este campo técnico, no sólo crece en empuje y alcance, sino hasta qué punto también sirve de apoyo a nivel nacional e internacional al desarrollo de las EERRMM.

La última sesión recogió aspectos transversales en el desarrollo de las EERRMM. En ella Tecnalia comenzó por recoger aspectos a incorporar a las metodologías de desarrollo de las EERRMM; siguió una presentación sobre las oportunidades que abren las EERRMM para Ingeniería Naval realizada por el PAT18;

a continuación Nautilus Floating Solutions mostró su desarrollo de plataformas eólicas flotantes; y finalmente March-JLT informó del papel de las aseguradoras en los parques offshore y su posible diversificación al resto de las EERRMM.

La sesión de clausura contó con la presentación de las oportunidades de financiación que ofrece el CDTI y que podrían ser de aplicación en el campo de las EERRMM y fue cerrada por el presidente de APPA Marina junto con el Director de la ETSIN.