Profile Status: Published

Technology Request

Seeking technologies to integrate and improve hybrid solar windmill for groundwater pumping

Summary

A Singapore SME that provides high quality integrated piping solutions for water and wastewater infrastructure projects is looking to integrate its mechanical windmill and solar pumping systems into a hybrid unit to optimize it with the minimum number of boreholes required and provide the highest availability of pumping time while maintaining cost competitiveness. The company is keen to seek R&D, licensing or joint venture partnerships with MNEs or SMEs of any size.

Creation Date	17 March 2017
Last Update	28 March 2017
Expiration Date	28 March 2018
Reference	TRSG20170315001
Public Link	https://een.ec.europa.eu/tools/services/PRO/Profile/Detail/817ed856-0f25-45fc-9a74-b14381d2bc2c

Details

Description

Windmills have been traditionally used in cattle ranches and farms. With the growing size of farmlands and deepening groundwater tables, users are moving towards solar alternatives where the solar pumping system can pump with higher flows and heads. However, they are associated with increased operation/maintenance requirements and higher costs.

The Singapore company offers traditional windmills that use 12-18 blades which produce high torque with variable stroke ability and use geared transmission. The windmill uses a reciprocating or crank piston pump. The windmill systems face challenging operating conditions with groundwater of more than 75 m to 150 m. The required flow rate is also much higher than the system design (30 m3/d). As the current windmill system only has a limited head of around 100 m, it is insufficient to overcome the depth and required flow rate.

The Singapore company also employs solar pumps which use electric motors that have much higher power, allowing them to have a head of more than 200 m with much higher flow rates. However, the short pump lifespan (2yrs) and the maintenance requirements for the pump which is running at high rpm would be major issues.

The Singapore company is looking for a suitable partner to integrate the electrical solar pump system into the mechanical windmill system to overcome these issues.

The types of partnerships sought include:

- License agreement
- Joint Venture agreement
- Research cooperation agreement

The types of partners sought include:
- SMEs of any sizes
- MNEs

Technical Specification or Expertise Sought

The technical specifications or considerations include:

- Windmill efficiency and performance such as direct drive mechanisms, electric wind generators with direct motor drive without batteries or inverters or innovative blade designs, etc

- Valve technology to allow using of windmill pump and solar pump in the same borehole

- Low maintenance and minimal costs would be required

- The system would also need to overcome the high head and high flows requirements

The company is not interested in wind turbine power generators, energy storage or battery solutions, solar panel designs or pump designs.

Stage of Development

Available for demonstration

IPR Status

Patents granted

Keywords

Technology

04002007	Heat pump
04002009	Turbines
04005008	Wind energy
10002007	Environmental Engineering / Technology

Market

06002004	Hydro-electric
06007001	Other energy production
08005	Other Industrial Products (not elsewhere classified)

NACE

D.35.1.1	Production of electricity
E.36.0.0	Water collection, treatment and supply

Network Contact

Issuing Partner

ASTER - SOCIETA CONSORTILE PER AZIONI

Contact Person

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Open for EOI : Yes

Dissemination

Send to Sector Group

Environment

Client

Type and Size of Organisation Behind the Profile

Industry SME 50-249

Year Established

1979

Already Engaged in Trans-National Cooperation

Yes

Languages Spoken

English

Client Country

Singapore

Partner Sought

Type and Role of Partner Sought

The types of partnerships considered include
- License agreement
- Joint Venture agreement
- Research cooperation agreement

The types of partners sought include:
- MNEs
- SMEs of any sizes

The role of the partner would be one that is a co-developer or provider of the requested technology with experience in mechanical windmills and solar pumping systems.

The desired partnership can be in the form of a research cooperation or licensing where the Singapore company can productise/commercialise it from the joint R&D efforts or licensing of the technology and offer it to the Singapore and regional markets.

Alternatively, the Singapore company is open to a Joint Venture with the partner to form an entity in Singapore where the co-developed product can be jointly offered to the Singapore and regional markets.

Type and Size of Partner Sought

SME 11-50,SME <10,>500 MNE,251-500,SME 51-250,>500

Type of Partnership Considered

License agreement
Joint venture agreement
Research cooperation agreement

Attachments

Profile Status: Published

Technology Offer

Axial flux permanent magnet electrical machine with magnetic flux concentration

Summary

A small Romanian company is offering for cession an EPO patent for an axial flux permanent magnet electrical machine with magnetic flux concentration. This type of machine has the advantage of lower rotor weight and also presents a solution to mount the magnetic poles onto a rotor wheel. The company is looking for manufacturers who will design a final product and will launch it on the market under license agreement.

Creation Date	27 September 2016
Last Update	26 September 2017
Expiration Date	08 April 2018
Reference	TORO20160927001
Public Link	https://een.ec.europa.eu/tools/services/PRO/Profile/Detail/8b359e1c-d70b-43f0-ad87-07a7df43cbb2

Details

Description

The company offering the technology is located in Cluj-Napoca, Romania, and is focusing on the research of small wind turbines. It is offering a patented method to manufacture an axial flux electrical machine for low speed, high torque applications.

Permanent magnet axial-flux machines consist of a number of rotor discs and stator discs fitted axially along a shaft. The rotors and stators are separated by an air-gap. The permanent magnets (PMs) are placed circumferentially round the rotor discs with alternating north and south poles facing the stator. The stator disc can be made from non-magnetic, non-conducting material or from a laminated magnetic material. The coils are wound on the stator and can be placed in slots or in the air-gap. The winding can be distributed, concentrated or placed toroidal round the iron stator disc.
This patent presents a comprehensive state of the art on these types of machines and an innovation regarding the windings that are recessed into a surface of the stator or rotor disc. It presents different topologies of axial-flux permanent magnet machines, but share a common rotor (rotors) design: they have a plurality of PMs mounted radially, with alternating circumferential magnetization and intercalated with magnetic poles.

This invention proposes a solution to reduce the mass (and thus the inertia) of the rotor and also a solution to mount the magnetic poles onto a rotor wheel. Another purpose of the invention is to achieve an electrical machine with low construction cost, lower volume and mass, robustness and high efficiency. The invented machine has a number of different uses. When used as an

electrical power generator, the machine can be used with a wind turbine, a water turbine or other types of apparatus.

The company is interested to collaborate with manufacturers of electrical machines who want to implement the designed technology. Cooperation in a form of license agreement (cession, with technical support in implementation process if needed, or other cooperation type) is offered.

Advantages and Innovations

The technology provides a rotor structure where the PMs are mounted radially onto a rotor wheel and intercalated with the magnetic poles. Also, the PMs are mounted considering an alternating circumferential magnetization for each rotor disc. This arrangement allows the concentration of the magnetic flux into the magnetic poles. The advantages of this rotor structure over the conventional ones are:
1. The flux density in the magnetic poles is higher than in the PMs, thus cheaper with lower magnetic remanence PMs can be used;
2. To increase the magnetic flux density, the axial length of the machine could be increased instead of the radius length;
3. If rare-earth PMs are to be used, the machine could be built in a more compact size and lower mass;
4. Allows a better fixation of PMs.

Stage of Development

Concept stage

Comments Regarding Stage of Development

A similar electrical machine was built and tested in a laboratory without the mounting solution of the magnetic poles onto the rotor wheel.

IPR Status

Granted patent or patent application essential

Comment Regarding IPR status

The patent has the following designated states: AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LI, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR
Until 30 October 2016 the entry into national phase should be made.

Profile Origin

National or Regional R&D programme

Keywords

Technology

04002005	Generators, electric engines and power converters
04005002	Hydropower
04005008	Wind energy

Market

06002	Power generation

06003	Alternative Energy

NACE

C.27.1.1	Manufacture of electric motors, generators and transformers
M.72.1.9	Other research and experimental development on natural sciences and engineering

Network Contact

Issuing Partner

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Open for EOI : Yes

Dissemination

Send to Sector Group

Intelligent Energy

Restrict Dissemination to Specific Countries

Belgium, BosniaandHerzegovina, Bulgaria, CzechRepublic, Denmark, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Latvia, Lithuania, Luxembourg, Macedonia,TheformerYugoslavRepublicof, Moldova, Montenegro, Netherlands, Norway, Poland, Portugal, Russia, Serbia, Slovakia, Slovenia, SouthKorea, Spain, Sweden, Switzerland, Turkey, Ukraine, UnitedKingdom, USA,

Client

Type and Size of Organisation Behind the Profile

Industry SME <= 10

Year Established

0

Already Engaged in Trans-National Cooperation

No.

Languages Spoken

English
French

Client Country

Romania

Partner Sought

Type and Role of Partner Sought

Industrial partner, manufacturer of electrical machines, interested to put into production the electrical machine according to the patent.

Type and Size of Partner Sought

SME 11-50,SME <10,>500 MNE,251-500,SME 51-250,>500

Type of Partnership Considered

License agreement

Attachments

figure 1.png

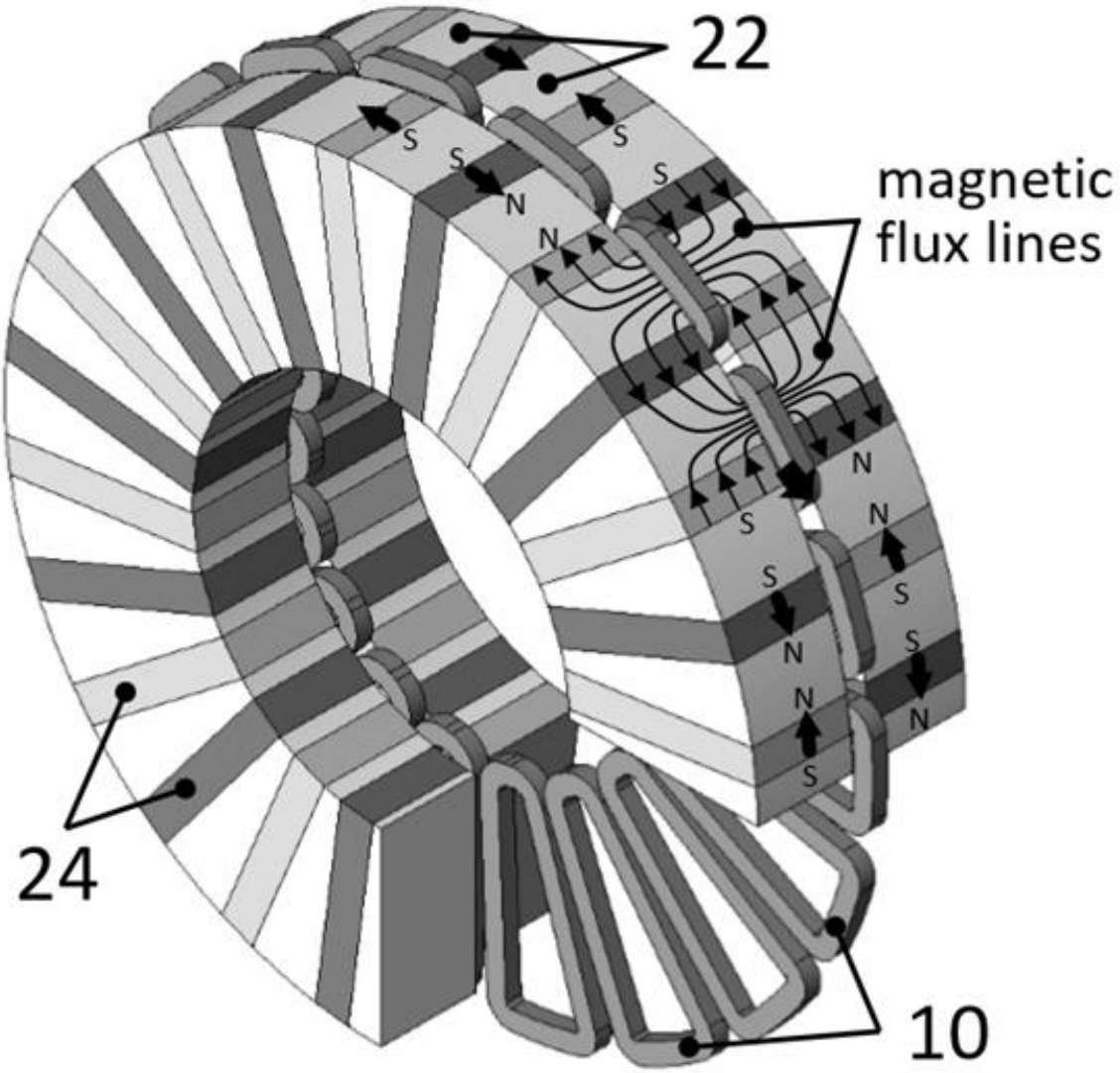


Figure 1 Related (prior) art

Profile Status: Published

Technology Offer

Optimal biogas generation from algae.

Summary

A German university offers a new method for a biotechnological production of biogas via bacterial fermentation of low-protein microalgae biomass. The method is simple and effective. There is no pre-treatment of the biomass needed. Industrial licensees interested in applying the method are sought.

Creation Date	03 April 2017
Last Update	06 April 2017
Expiration Date	06 April 2018
Reference	TODE20170403001
Public Link	https://een.ec.europa.eu/tools/services/PRO/Profile/Detail/44e7da83-04e6-4c03-85bc-86dd77042bff

Details

Description

The production of biogas from algae biomass has been of interest for a long time. Microalgae is an interesting bio-system as it is really fast growing and has a high biomass productivity which is about ten times higher than conventional agriculture crops. However several obstacles, such as, inefficient degradation and low C/N (carbon to nitrogen) ratio limit the applicability of algae biomass for a large scale biogas production process.

The present invention of a German university overcomes most of the technical and biological difficulties and now establishes an improved cultivation and fermentation process for microalgae biomass. The invention provides a simple and effective microalgae cultivation method (under nitrogen limiting conditions) for subsequent use of this biomass as mono-substrate for a highly efficient and stable anaerobic fermentation in continuous long-term mode (Fig.1).

The continuous fermentation of algae biomass, generated under replete-N and low-N culture conditions, was performed under constant hydraulic retention time (HRT 20 days) and increasing organic loading rate. In contrast to conventional biomass (replete-N BM), the biogas as well as methane productivity of the low-N biomass (low-N BM) reactor was constantly high (see Fig. 2), with biomass to methane energy conversion efficiency of 84%, which is close to the theoretical maximum without any pre-treatment.

Industrial licensees are sought who would apply the process. They could be biotechnology companies with renewable energy activities.

Advantages and Innovations

The technology enables the fast and competitive production of biogas in a continuous biotechnological process in industrial scale. It offers a number of advantages compared to conventional processes:

- More effective production process of biogas through continuous fermentation of microalgae
- More efficient energy source
- New optimized cultivation procedure (low-N) for fertilizer cost reduction
- No pre-treatment of biomass needed
- Methane content (61%) in biogas, higher than plant material
- Highly efficient fermentation to biogas / methane without inhibition risks

Stage of Development

Available for demonstration

Comments Regarding Stage of Development

Feasibility proof

IPR Status

Patent(s) applied for but not yet granted

Comment Regarding IPR status

European patent application

Profile Origin

Private (in-house) research

Keywords

Technology

04005006	Solid biomass
04005011	Bio-refineries for energy
04006	Biogas and anaerobic digestion (AD)
06002	Biology / Biotechnology

Market

04010	Microbiology
06003009	Biomass and Biofuels

NACE

M.72.1.1	Research and experimental development on biotechnology

Network Contact

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Open for EOI : Yes

Dissemination

Send to Sector Group

Intelligent Energy

Client

Type and Size of Organisation Behind the Profile

University

Year Established

0

Already Engaged in Trans-National Cooperation

Yes

Languages Spoken

English
German

Client Country

Germany

Partner Sought

Type and Role of Partner Sought

The university offers license agreements for commercial use to industrial partners interested in applying this process. Partners could be biotechnology companies with activities in renewable energy generation.

Type of Partnership Considered

License agreement

Attachments

fermentation.jpg

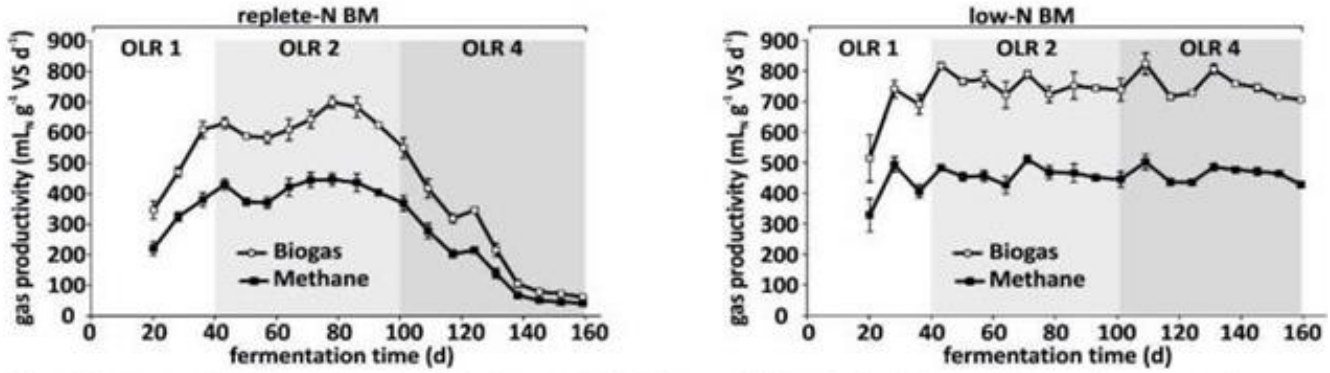


Fig. 2 Biogas and methane productivity via anaerobic fermentation of algal biomass in continuous mode.

Microalgae_Cultivation.jpg

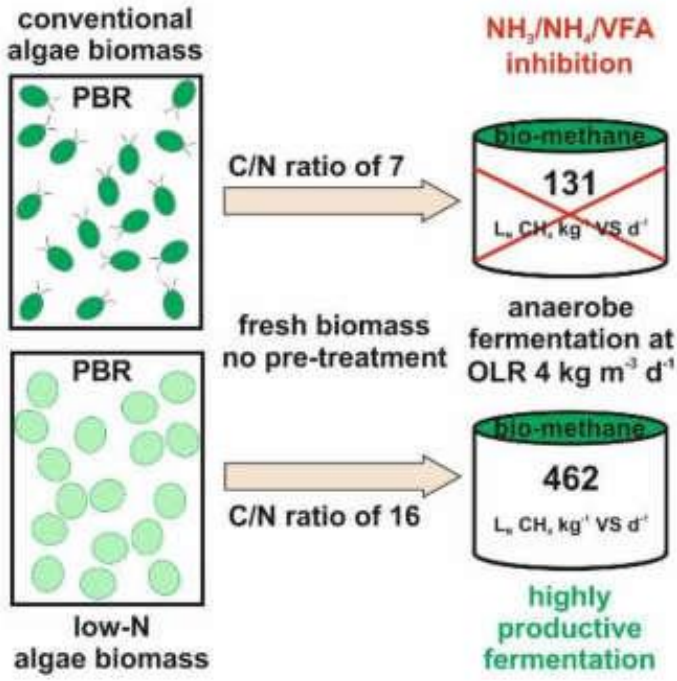


Fig. 1 Overview of microalgae cultivation and fermentation procedure