

MİSAL AR-GE

Enerji Bakanlığı verilerine göre Ülkemizde rüzgar enerjisi potansiyeli 48.000 MW olarak belirlenmiştir. 2015 yılı sonu itibarıyla işletmede olan rüzgar enerji santrallerinin kurulu gücü ise 4.503 MW'dir. Bu veriler ülkemizde ciddi bir potansiyelin olduğunun göstergesidir. Diğer taraftan kendi enerjilerini üretebilen akıllı yapılarda günümüzde oldukça popülerdir. Rüzgar türbinleri de içeren yeni yapılar üzerinde çalışmalar "Green Building" başlığı altında Amerika ve Avrupa'da öncelikli alanlar arasında yer almaktadır. Ancak mevcut rüzgar türbinlerinin yüksek rüzgar hızına, kule ve kurulacağı arsaya ihtiyaç duyması, gürültülü çalışması, bakım maliyetleri gibi faktörler yaygın kullanımını engellemektedir.

Eksen mili olmayan jeneratörün merkez yerine halka şeklinde türbin kanatlarının etrafında konumlandığı patentli rüzgar türbini tasarımı ile bahsettiğimiz bu problemlere çözüm üretirken aynı boyutta bilinen türbinlere göre en az iki kat daha fazla çıkış gücü sağlıyoruz. Bununla birlikte bu sıra dışı tasarımda kanat sayısını arttırdığında bu çıkış gücü beş katına kadar artabiliyor. Bunun temel sebebi benzer türbinlerin tersine kanat uçlarında geniş profiller kullanılmasıdır. Geniş kanat uçları çepeçevre rotorun dış kısmına bağlı olduğu için oldukça rijit ve çok daha ince profillerle bile oldukça dayanıklı, hafif ve ucuz üretilebiliyor. Yaptığımız simülasyon ve analiz çalışmaları iki bilimsel konferansta ve bir patent pazarında yayınlanmıştır.

Çok daha yavaş rüzgar hızlarında bile oldukça verimli çalışabilen sistem dişli kutusu içermiyor ve direct driver teknolojinin tüm avantajlarına sahip yeni jeneratör tasarımında mevcut farklı bobinlerin farklı devirler için aktive edilmesini sağlayan bir enerji yönetim sistemi sayesinde her rüzgar hızında optimum verimde çalışabiliyor. Belirli devir aralıklarında manyetik yatakta temassız dönen sistemde gürültü ve bakım masrafları oldukça az kule ve arsa maliyetleri yok ve şehir konseptinde binalara, köprülere kolayca monte edilebilir. [Proje Özeti]

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According to the report of Turkish Ministry of Energy, the energy generated from wind can reach 48,000 MW. Nevertheless, by the end of the year 2015, the installed capacity of wind power plants generates only 4,503 MW. This data indicates that there is currently a significant potential in our country to utilize the wind energy. On the other hand, nowadays smart structures that produce their own energy also become popular. Studies on new structures including wind turbines take place among priority areas in United States and Europe under "Green Building" concept.

However, the existing wind turbines need high wind speed and tall towers, large space of land and regular maintenance. Moreover, they are expensive and noisy particularly when used in residential areas or in cities. All these problems are barrier to expand the use of wind turbine as a green energy source. We are solving these problems by using a patented shaftless suspended multiple blade wind turbine which has a new generator that is constructed around the blades shroud instead of being at the center. The new design allows the use inversely laid down tapered blades that produces high torque and therefore can push the blades at low wind speed and generate at least two times more output power relative to the conventional design. By increasing the number of blades and employ a wind concentrator the output power can be posted up to five times. With a large blade surface area at the tip, there is no need for high wind speed to rotate the turbine since with any small wind speed, enough pressure will be acting on the blade leading to a large force on the tip and consequently a large torque due to the longer length (turbine radius). Moreover, the new design will be more rigid and secure even with thinner and lighter blades. The concept and detail simulation studies have been presented and published in two international conferences and also in a project bazaar.

The new wind turbine system can operate efficiently at lower wind speeds, does not have gearbox and has all the advantages of direct driver technology. The new generator design which has different coils activated by the energy management system, can control the turbine speed to keep turbine efficiency at its optimum value for various wind speeds. The Mechanical noise due to friction is also eliminated as the rotor is magnetically suspended in the addition to the reduction of aerodynamics noise due to the shrouded blades. The new turbine concept is suitable to be installed in buildings and bridges and more sustainable than the conventional turbine.

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potential in our country to utilize the wind energy. At On the other hand, nowadays smart structures that produce their own energy also become very popular. Studies on new structures including wind turbines take place among priority areas in United States and Europe under "Green Building" concept.

However, the existing wind turbines needs to high wind speed and tall, set up the towers, and large space of land, and regular maintenance. The current wind turbines are also noisy and costly to use at low wind speed. All these factors are barrier to expand the use of wind turbine noisy work, maintenance costs which are the main barriers to the expansion of wind turbines. We are solving these problems by using the patented shaftless multiple blade wind turbine which has new generator that is constructed build around wind the turbine blades instead of the center. With the new inversely tapered blade design, at the same time we are generating at least two times more output power for the same turbine by using same size. This can increase the output power up to five times at low wind speed, if we increase the number of blades and using wind concentrator relative to the conventional trubine, unconventional wing design. There is no need for high wind speed torque to rotate the turbine since with low any small wind pressure acting on the blade tip will produce a large force will be resulted at the tip due to the large blade surface area. Moreover this force at the balde tips will produce large toque due to the longer length (turbine radius), and torque due to its relatively larger area. The main reason for this is to use a larger profile in the tip which is opposite to the existing wind turbines. Moreover, the new design will be Rotor blades can be much more rigid even with thiner and lighter blades and lighter. The general concept and the simulation study which has done by us been presented and has published in two international conferences and also in a project bazaar.

The new wind turbine system The system that can operate efficiently at lower much slower wind speeds very efficient, does not sn't have any gearbox and has all the advantages of direct driver technology. The new generator design which has different coils activated by the energy management system, can control the turbine speed to to keep turbine efficiency at it optimum value for for maximize the efficiency in different various wind speeds. Mechanical noise due to friction is also eliminated as the rotor is magnetically suspended. The new turbine concept is more suitable to be can be installed in to buildings and bridges easily. [Executive Summary]

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