



TÜRKİYE RÜZGAR ENERJİSİ BİRLİĞİ
TURKISH WIND ENERGY ASSOCIATION



ODTÜ
METU



Turkish Wind Energy Association & Its Activities

Ankara, 13.09.2017

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About Turkish Wind Energy Association (TWEA)

Turkish Wind Energy Association was established in 1992 with the decision of the Council of Ministers by the Republic of Turkey, Ministry of Energy and Natural Resources, it is the strongest non-governmental organization in relation to Wind Energy in Turkey. The aim is to add Turkey's Wind Energy potential to its economy. TWEA is also the official member of both the Global Wind Energy Council (GWEC) and the Wind Europe.

TUREB works for gaining extensive use of Wind Energy Potential in Turkey to the country's economy, coordinated with General Directorate of Renewable Energy (YEGM), Turkish Electricity Transmission Company (TEİAŞ), General Directorate of Energy Affairs (EİGM), Energy Market Regulatory Authority (EMRA) and Ministry of Energy.

T.C.
ENERJİ VE
TABİİ KAYNAKLAR
BAKANLIĞI

EPDK
ENERJİ PİYASASI
DÜZENLEME KURUMU

REPUBLIC OF TURKEY
PRIME MINISTRY
INVESTMENT
SUPPORT AND PROMOTION
AGENCY

Wind⁺
EUROPE

GWEC
GLOBAL WIND ENERGY COUNCIL



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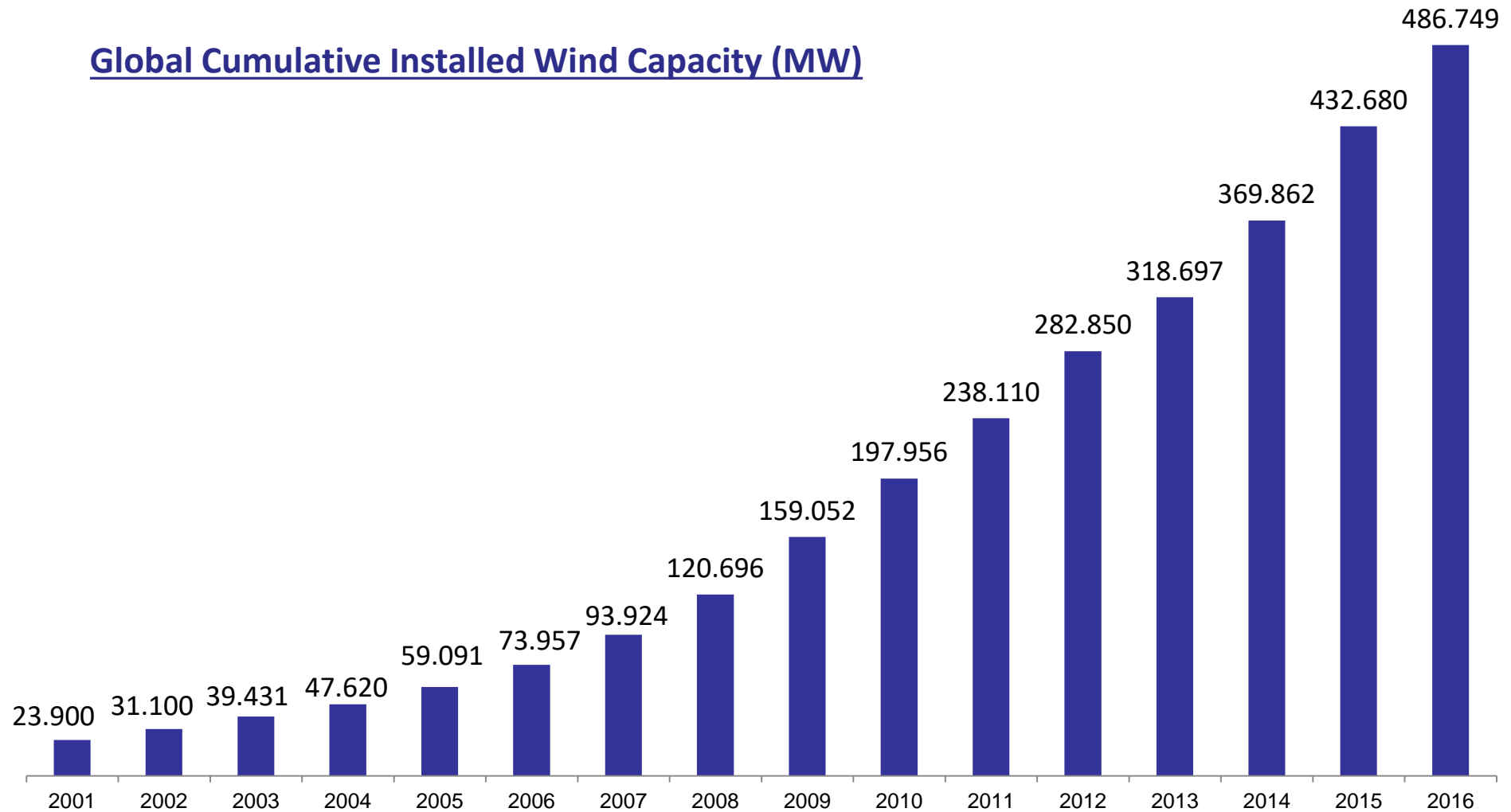




TÜRKİYE RÜZGAR ENERJİSİ BİRLİĞİ
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Global Cumulative Installed Wind Capacity (MW)



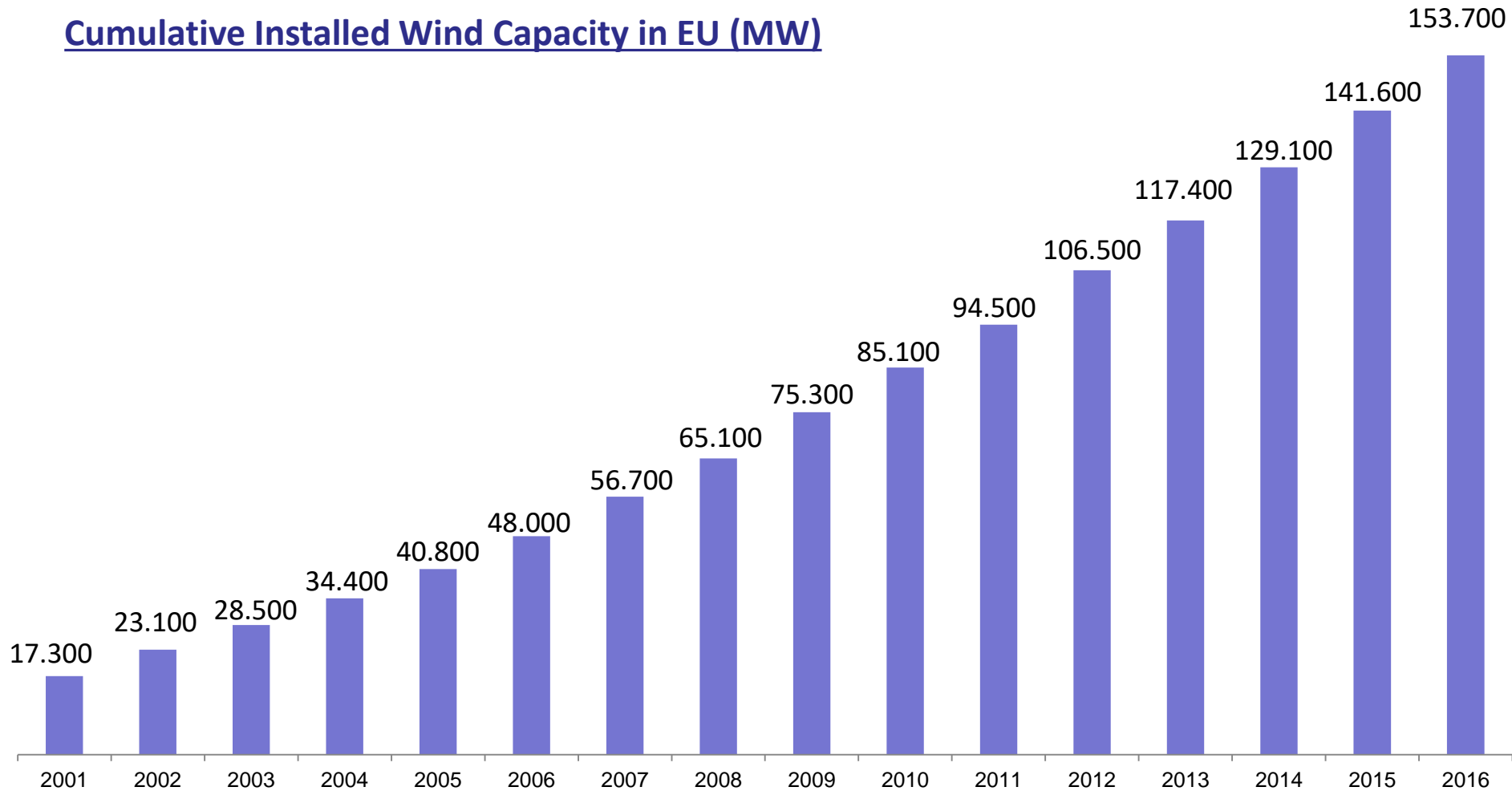
Source: GWEC



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Cumulative Installed Wind Capacity in EU (MW)



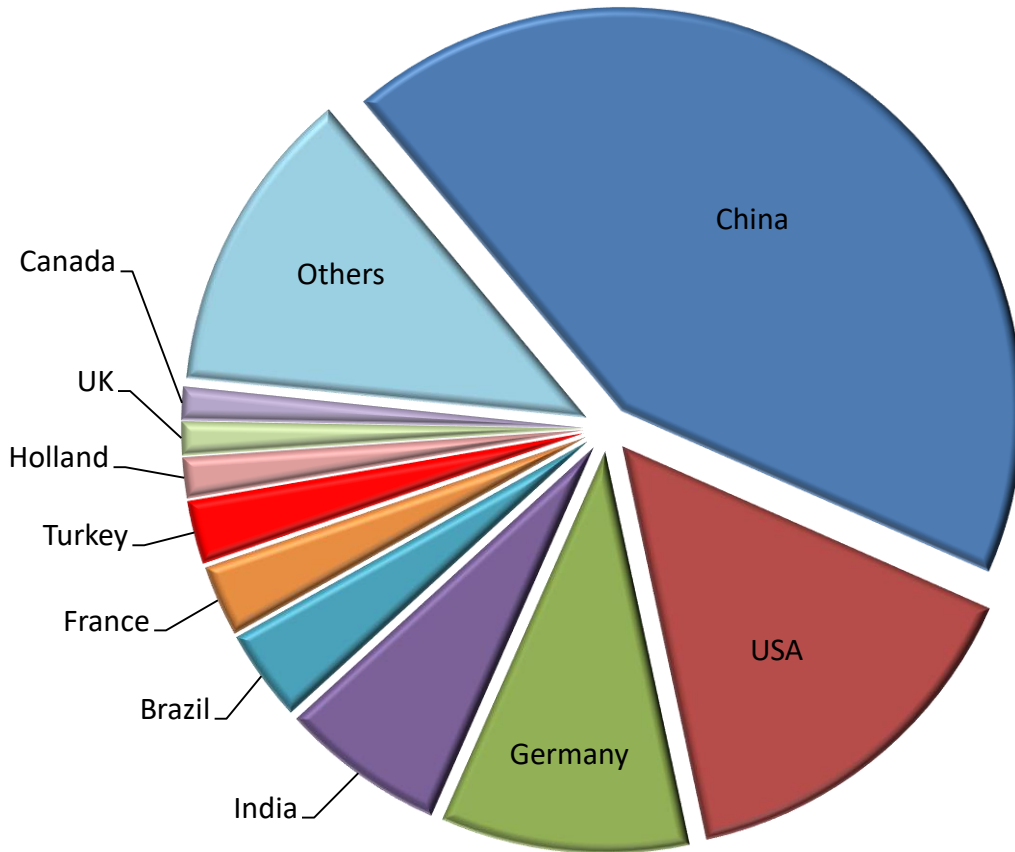
Source: WindEurope



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TURKEY in Global Market

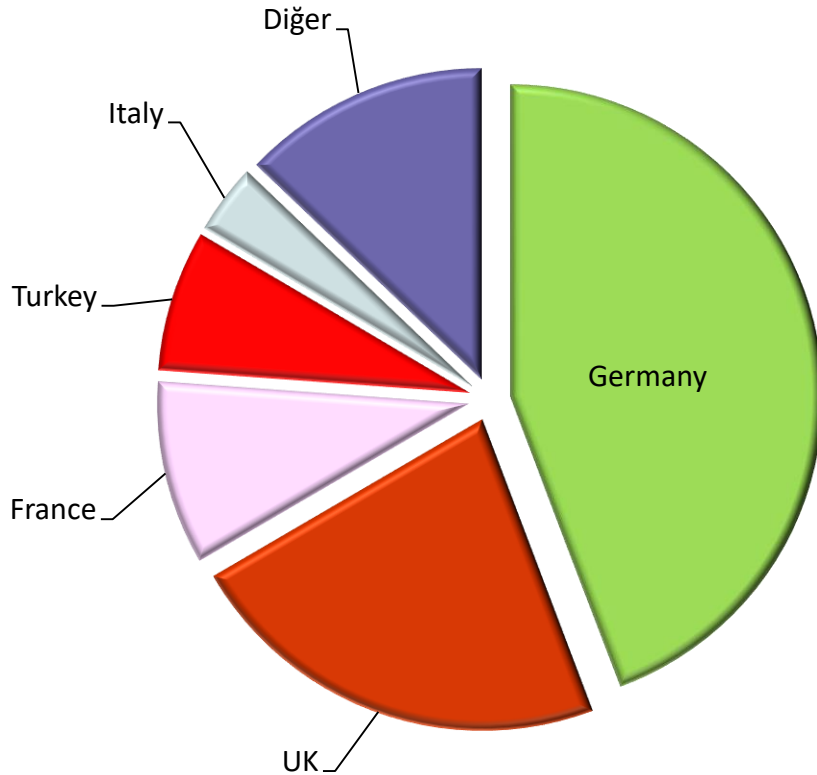


	Ülke	MW	Yüzde
1.	China	23.328	42,7
2.	USA	8.203	15,0
3.	Germany	5.443	10,0
4.	India	3.612	6,6
5.	Brazil	2.014	3,7
6.	France	1.561	2,9
7.	Turkey	1.387	2,5
8.	Holland	887	1,6
9.	UK	736	1,3
10.	Canada	702	1,3
	Other	6.727	12,3
	First 10 Total	47.873	88
	Global Total	54.600	100



TURKEY in European Market

MW



	Ülke	MW	Yüzde
1.	Germany	2.281	44,3
2.	UK	1.151	22,3
3.	France	492,35	9,6
4.	Turkey	377,85	7,3
5.	Italy	187	3,6
	Other	664	12,9
	Total	5.153	100

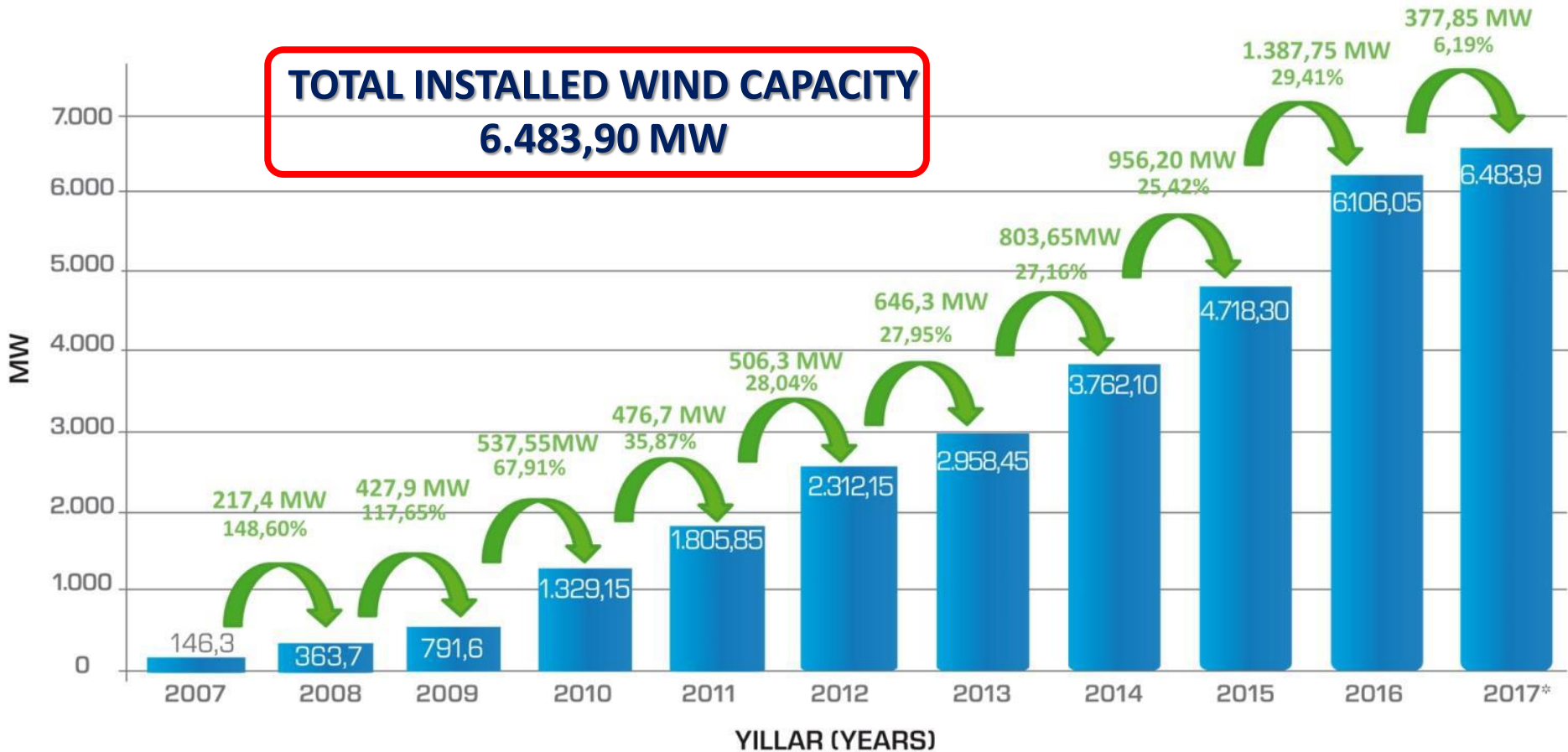


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Annual and Cumulative Installations for Wind Power Plants in Turkey (MW)

TOTAL INSTALLED WIND CAPACITY
6.483,90 MW



*Temmuz 2017 itibariyle (As of the month July 2017)



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Deloitte.



Türkiye Rüzgar Enerjisi Birliği Rüzgar Enerjisi ve Etkileşim Raporu

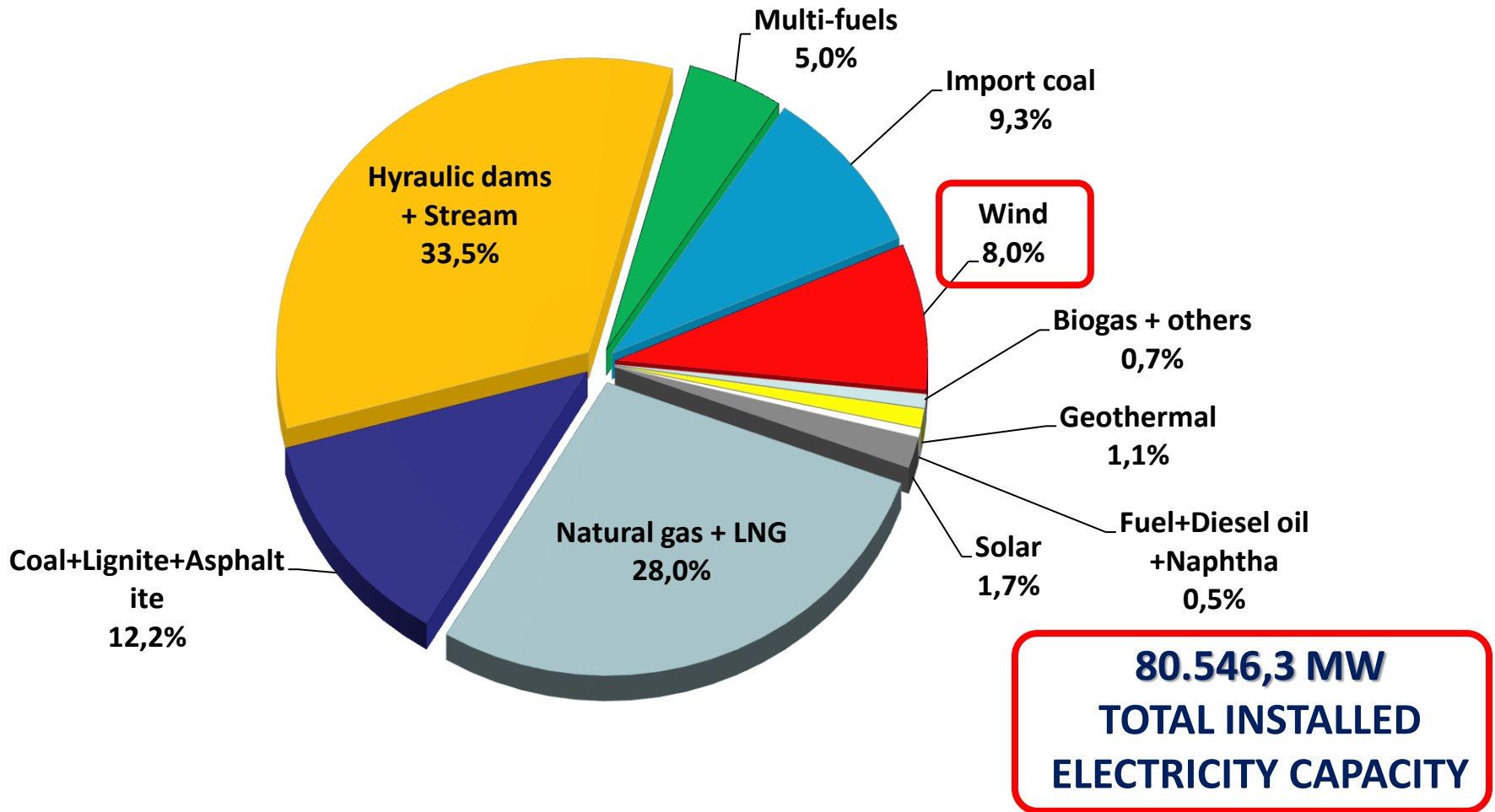
Esip Geçmesin: Her yıl 1000 MW RES ile
Türkiye değişir.



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Electricity Energy Mix in TURKEY

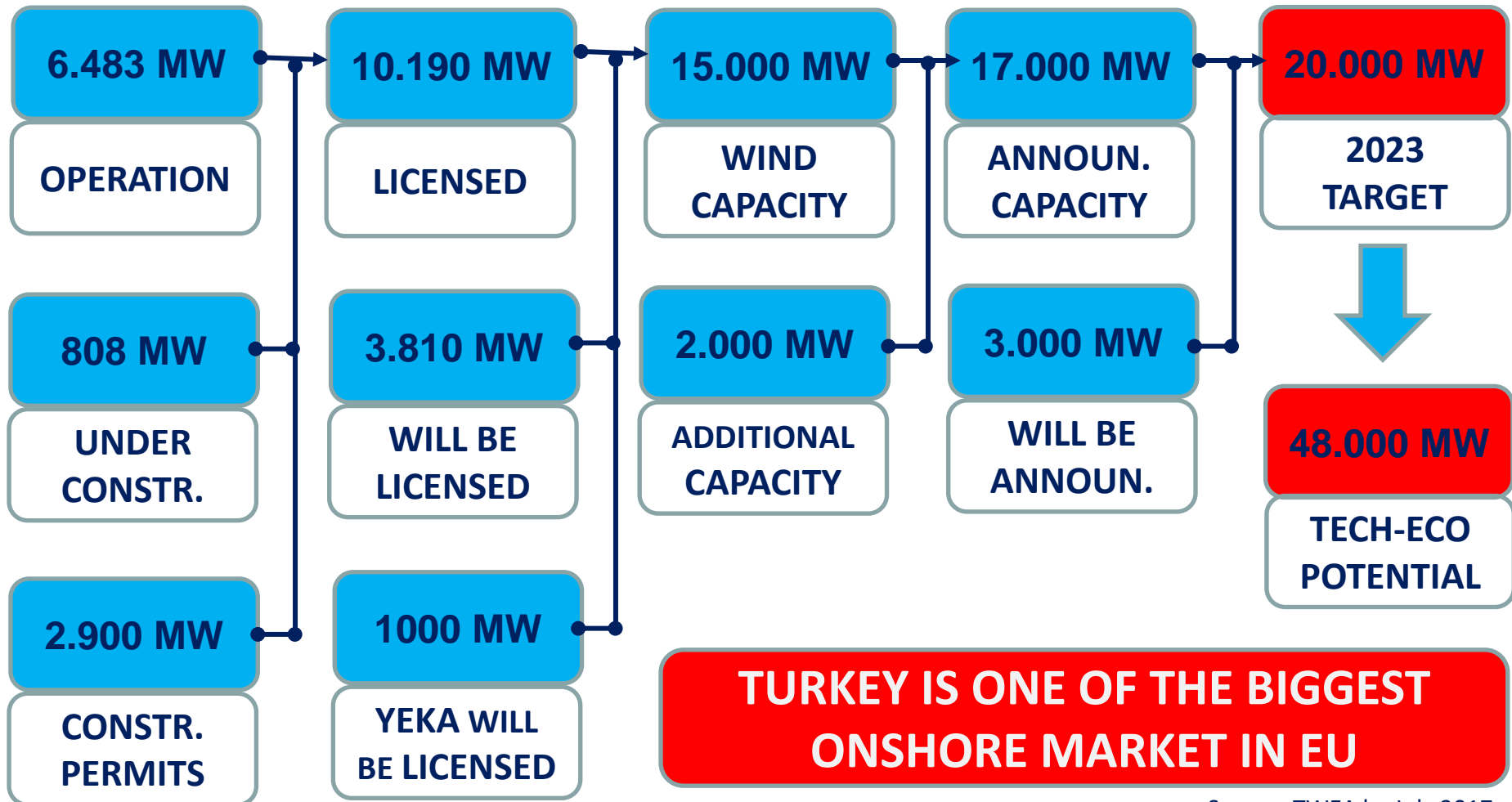




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Wind Sector with numbers in TURKEY

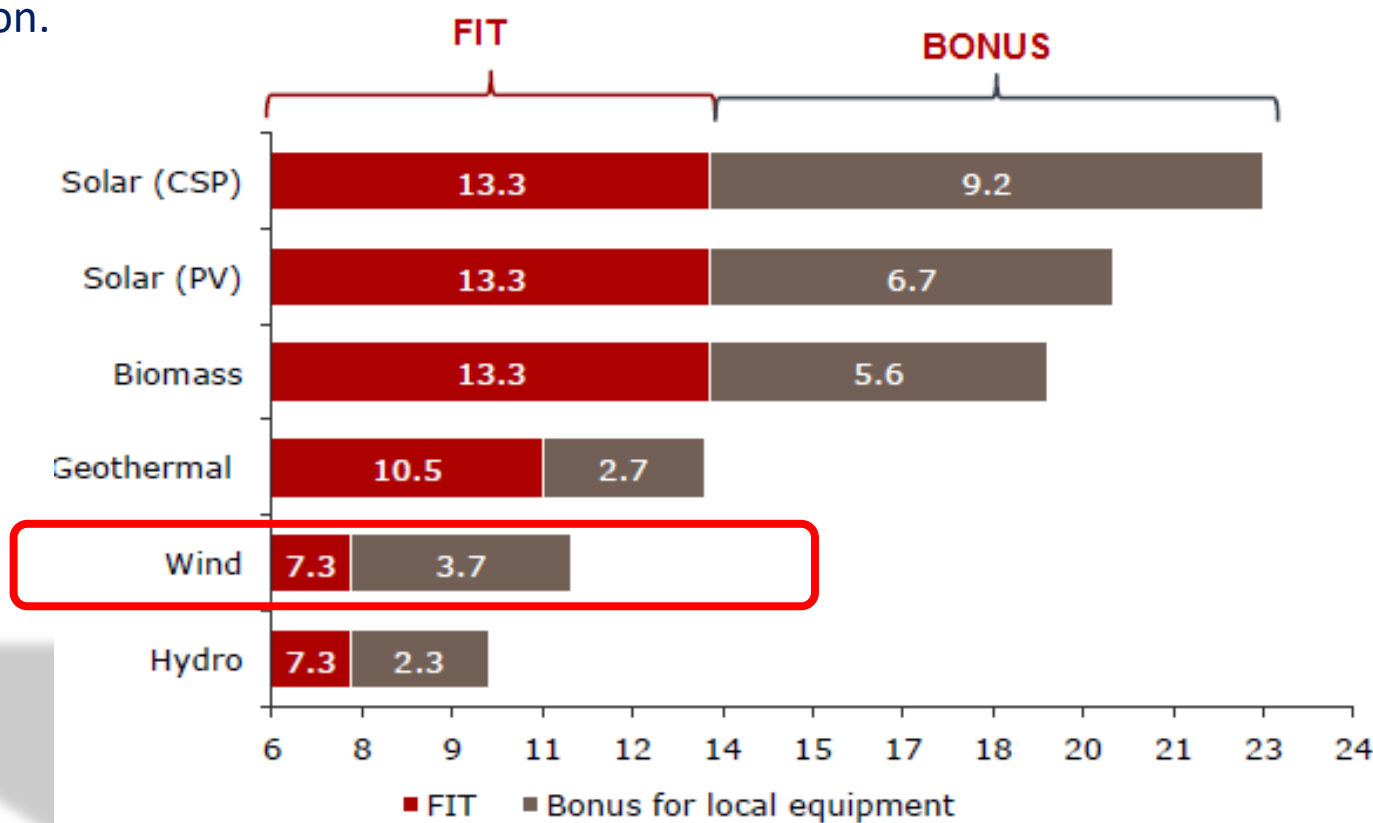




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Feed-in Tariff and Local Equipment Bonus in Renewables

In Turkey, renewable electricity production is mainly promoted through a guaranteed feed-in tariff mechanism. The Renewable Energy Support Mechanism's feed-in tariff for renewable energy sources is between **7,3 – 13,3 USD cents/kWh** for 10 years of operation.





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Feed-in Tariff and Local Equipment Bonus for Wind Energy

Feed-in Tariff



**7,3 USD
cent/kWh**

Local Bonus



**3,7 USD
cent/kWh**

Tower

0,6 USD cent / kWh

Blade

0,8 USD cent / kWh

**Generator and Power
Equipments**

1,0 USD cent / kWh

All Mechanic Equipments

1,3 USD cent / kWh



TÜRKİYE RÜZGAR ENERJİSİ BİRLİĞİ
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21-22-23 June 2017 Grid Capacity Auctions 11 Region 710 MW

Company Name	Project Name	Installed Tender Capacity	Offer Price (USD)	Allocated Capacity (MW)	Grid Connection Area
EnerjiSA Enerji Ür. A. Ş.	Erciyes RES	80,00	2,90	65,00	35/KAYSERİ-NİĞDE (80 MW)
Esengüç Enerji Yatırım A. Ş.	Ovacık RES	15,00	-0,01	15,00	35/KAYSERİ-NİĞDE (80 MW)
Günyeli Res Enerji Yatırım Ür. ve Tic. A. Ş.	Saimbeyli RES	60,00	5,12	4,60	01/ADANA (120 MW)
Atasa Enerji İnş. Taahhüt Tur. San. ve Tic. A. Ş.	Atasa RES	23,40	5,00	23,40	01/ADANA (120 MW)
Akdeniz Res Enerji Yatırım Ür. ve Tic. A. Ş.	Mansurlu RES	60,00	4,74	60,00	01/ADANA (120 MW)
CGN Enerji Tekstil Sanayi ve Dış Tic. Ltd. Şti	Andoz RES	32,00	4,78	32,00	01/ADANA (120 MW)
Jüpiterges Elektrik Üretim A. Ş.	Jüpiterges RES	49,00	4,19	40,00	07/ANKARA-KIRIKKALE-ÇANKIRI (60 MW)
Simge Res Enerji Yatırım Ür. ve Tic. A. Ş.	Beypazarı RES	20,00	4,18	20,00	07/ANKARA-KIRIKKALE-ÇANKIRI (60 MW)
Res Anatolia Holding A. Ş.	Opal RES	60,00	-1,15	60,00	05/AKSARAY-KIRŞEHİR-NEVŞEHİR (60 MW)
Fesleğen Yenilenebilir En. ve El. Ür. A. Ş.	Fesleğen RES	40,00	-1,51	40,00	24/EDİRNE (40 MW)
Kaktüs Yenilenebilir En. ve El. Ür. A. Ş.	Kaktüs RES	49,50	-1,49	49,50	44/TEKİRDAĞ (60 MW)
Buket Yenilenebilir En. ve El. Ür. A. Ş.	Buket RES	49,50	-1,48	10,50	44/TEKİRDAĞ (60 MW)
Res Anatolia Holding A. Ş.	Elmacık RES	70,00	-1,61	70,00	36/KIRKLARELİ (70 MW)
Pelit Yenilenebilir Enerji ve El. Ür. A. Ş.	Pelit RES	80,00	-0,81	80,00	43/SİVAS (80 MW)
Grgn Yenilenebilir Enerji ve El. Ür. A. Ş.	GRGN RES	40,00	-0,33	40,00	45/TOKAT (40 MW)
Özgül Kamelya Yenilenebilir Enerji ve El. Ür. A. Ş.	Kamelya RES	49,50	-0,33	40,00	41/ORDU (50 MW)
Baysal Elektrik Ür. A. Ş.	Bayır RES	10,00	-0,37	10,00	41/ORDU (50 MW)
Res Anatolia Holding A. Ş.	Işıklar RES	50,00	-1,03	50,00	16/BİLECİK-ESKİŞEHİR-KÜTAHYA (50 MW)

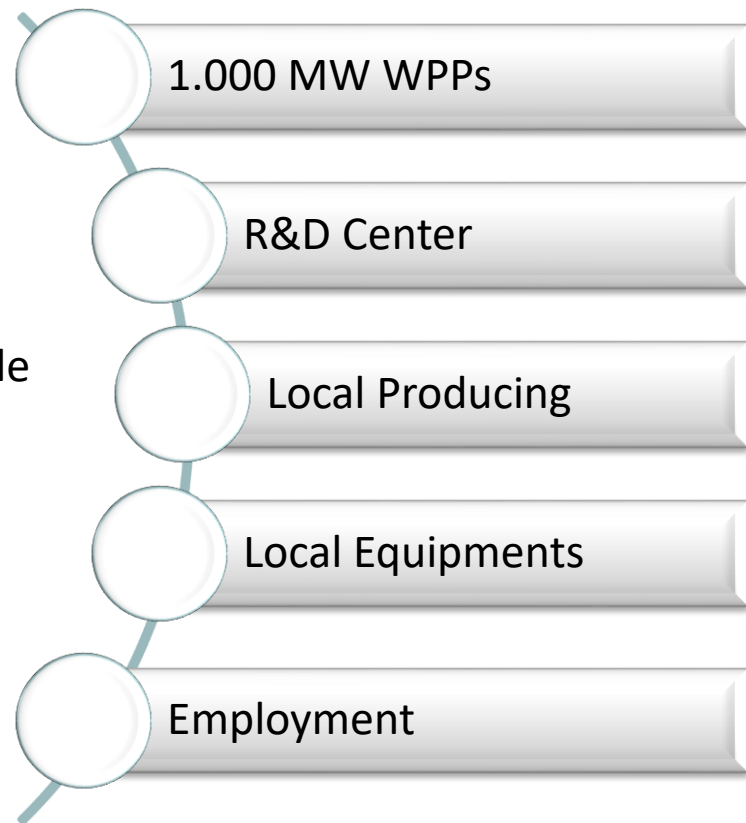


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YEKA Investment Model

It is the new investment model introduced for Renewable Energy Sources in order to support renewable energy investments and to promote local production of renewable production assets.





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YEKA Investment Model

- %65 of the equipment of turbine has to be local
- Technology Supplier will establish manufactory
- Tariff will be for 15 years, after the contract
- 150 unit/year on one shift Manufactory capacity.
- Technology Supplier has to make R&D for 10 years with a budget of 45 mio USD.
- More than 50 personnel has to work for the R&D works.
%80 of this personnel should be Turkish.
- The performance bond for participation is 10 mio USD.
- The performance bond for the winner is 50 mio USD.

5 Grid Capacity Region

- 250 MW Kayseri - Niğde
- 250 MW Sivas
- 700 MW Edirne - Kırklareli - Tekirdağ
- 250 MW Ankara - Çankırı - Kırıkkale
- 250 MW Bilecik - Kütahya - Eskişehir



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YEKA Investment Model

8 Consortium

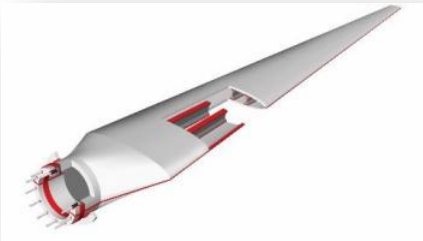
- Vestas (Denmark) – Enerjisa, **Eliminated in the sealed tender**
- Enercon (Germany) - Polat Enerji - Limak, **Eliminated in the sealed tender**
- Goldwind (China) - Akfen Holding – Beyçelik, **Eliminated in the sealed tender**
- GE (America) - Fina Enerji, **Withdraw with 5,48 \$c/kWh offer at 1. Round**
- Senvion (Germany) - IC İçtaş Enerji, **Withdraw with 5,27 \$c/kWh offer at 1. Round**
- Nordex (Germany) - İklim El.- MKS Marmara – Zorlu, **Withdraw with 4,14 \$c/kWh offer at 3.Round**
- MingYang (China) - İlk İnşaat, **Withdraw with 3,50 \$c/kWh offer at 29. Round**
- Siemens (Germany) - Türkerler- Kalyon, **Won the auction with 3,48 \$c/kWh offer at 30. Round**



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Blade Manufacturers



- Enercon Aero
- LM Wind – GE
- TPI Composites

Tower Manufacturers



- Alke
- Ateş Çelik
- Çimtaş
- Enercon Tower
- Gesbey
- Çiltuğ
- Tamsan

Generator Manufacturer



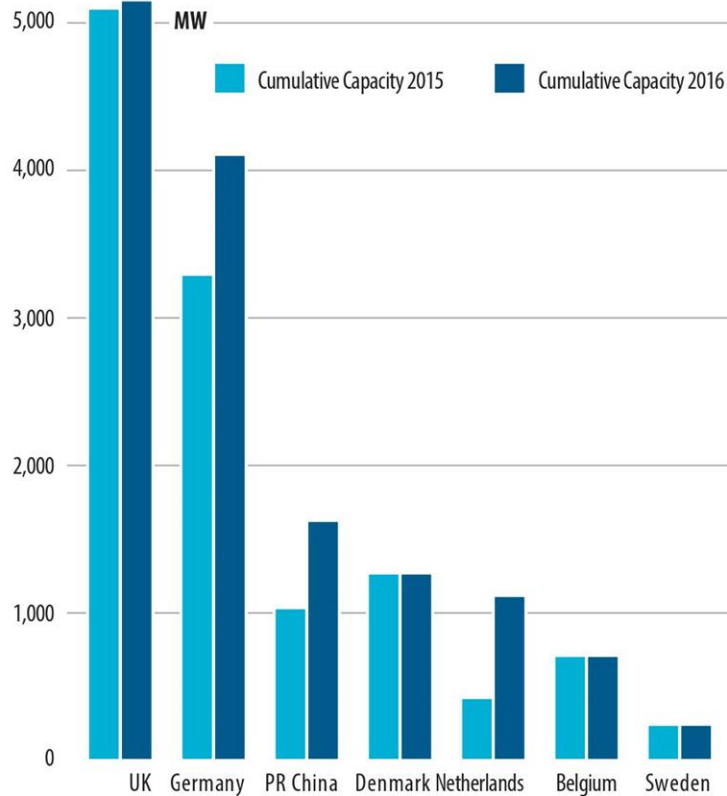
- Siemens



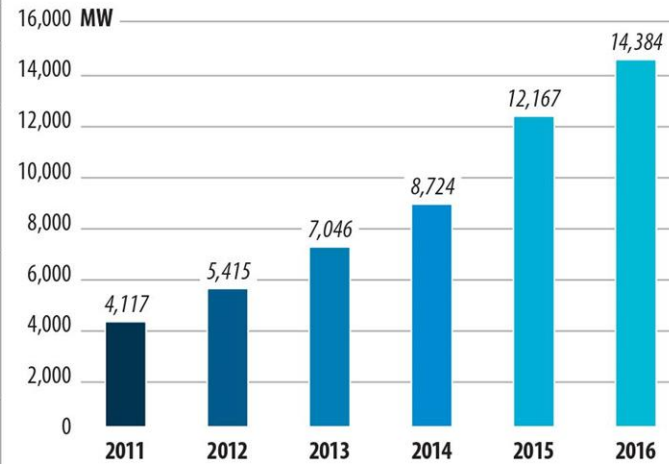
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Off-shore Wind

GLOBAL CUMULATIVE OFFSHORE WIND CAPACITY IN 2016



ANNUAL CUMULATIVE CAPACITY (2011-2016)



	UK	Germany	PR China	Denmark	Netherlands	Belgium	Sweden	Japan	S Korea	Finland	US	Ireland	Spain	Norway	Portugal	Total
Total 2015	5,100	3,295	1,035	1,271	427	712	202	53	5	32	0.02	25	5	2	2	12,167
New 2016	56	813	592	0	691	0	0	7	30	0	30	0	0	0	-2	2,219
Total 2016	5,156	4,108	1,627	1,271	1,118	712	202	60	35	32	30	25	5	2	0	14,384

Source: GWEC



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Academic Approach to Renewable Energy by EU Wind Energy Projects and Employment

To develop local technology and design based production

- 1) Strategic and technological road maps should be prepared by the main and subsidiary companies, together with the university.
- 2) Planning should be done to train qualified human resources for the needs of the main and subsidiary industries.
- 3) "National Focus Projects" should be established and supported for localization in public coordination.
- 4) Laboratory sub-structures of universities and vocational high schools with competence in the field of materials should be developed and supported within the framework of university-industry collaboration.



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Academic Approach to Renewable Energy

İzmir High Technology Institute Continuous Training Center (İYTESEM) will provide "Wind Energy Training" with the support of Turkish Wind Energy Association on **15 - 16 September 2017**.



- Wind Energy in the World, in Europe, in Turkey
- Wind Energy Subheadings
- Environmental Effects of Wind Energy
- Introduction to Wind Meteorology
- Wind Measurement Systems
- Wind Data and Data Analysis
- Land Wind Flow Modeling Methods
- Wind Energy Aerodynamics
- CFD and Wind Energies
- Wind Model Inputs and General Use Tools
- Sample Project Work
- Wind Turbine Technology and Manufacturers
- Wind Projects Administrative Processes
- Wind Energy Projects



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EU Wind Energy Projects and Employment

Within the scope of "Grant Scheme for Supporting Young Employment in Sectoral Investment Areas" by Güney Marmara Development Agency, the first "**Wind Energy Vocational Training Center**" was established in Turkey as of March 2016 serving the Balıkesir University Continuing Education Center.



- GESBEY Enerji Türbini Kule Üretim Sanayi Ve Ticaret A.Ş.
- Enerjisa Enerji Üretim A.Ş.
- TPI Kompozit Kanat Sanayi Ticaret A.Ş.
- Polat Enerji Sanayi Ve Ticaret Aş
- Briza Rüzgar Elektrik Üretim San Ve Tic. Aş
- Ekosinerji Elektrik San. Ve Tic. A.Ş.
- Enisolar Enerji Çözümleri
- Borusan EnBW Enerji
- Ataseven Group
- Enercon Aero Rüzgar Endüstrisi A.Ş.
- Northel Enerji A.Ş.
- Vestas Rüzgar Enerjisi Sistemleri San. Ve Tic. Ltd. Şti
- Esinti Enerji Üretim Tic. Ve San. A.Ş



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EU Wind Energy Projects and Employment

Within the scope of "Grant Scheme for Supporting Young Employment in Sectoral Investment Areas" supported by the European Union and published by the Coordination Office of the European Union Coordination Department of the Ministry of Labor and Social Security, Amasya University Technology Faculties adopted the **"Energy for Production, Vocational Training for Employment Project."**



- Renewable Energy Feasibility
- Environment and Energy Security
- Energy Politics and Law
- CAD / CAM,
- PLC / SCADA
- Occupational health and Safety
- Quality Management Systems
- KOSGEB Entrepreneurship



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Departments in Wind Sector

computer engineering

industrial design engineering

public administration

construction engineering

energy systems engineering

public relations

electrical and electronic engineering

meteorological engineering

Computer programming

mechanical engineering

topographical engineering

electronic technology

metallurgical and materials engineering

geological engineering

finance, banking and insurance

mechatronics engineering

manufacturing engineering

Welding technology

industrial engineering

urban and regional planning

land registry and cadaster

chemical engineering

Economics

Industrial molding

management

international trade

accounting



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Let's celebrate



**25th year of the Turkish Wind Energy Association
together**



**6. TÜRKİYE RÜZGAR ENERJİSİ KONGRESİ
TURKISH WIND ENERGY CONGRESS**

01-02 KASIM 2017 | JW Marriott, Ankara

Thank you ...



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