

Turkish Energy Market & Coal Investments

Ibrahim Ciftci, Greenpeace Mediterranean

15.03.2014, NY



GREENPEACE

www.greenpeace.org

Outline

- **Turkey Energy Sector Outlook**
- **Privatization of Electricity Market**
- **Official Energy Vision**
- **Future of coal**
- **Greenpeace Mediterranean's Works**
- **Greenpeace Mediterranean's Demands**

Outline

- **Turkey Energy Sector Outlook**
- **Privatization of Electricity Market**
- **Official Energy Vision**
- **Future of coal**
- **Greenpeace Mediterranean's Works**
- **Greenpeace Mediterranean's Demands**

Turkey Energy Sector Outlook

Country Profile

Main Trends

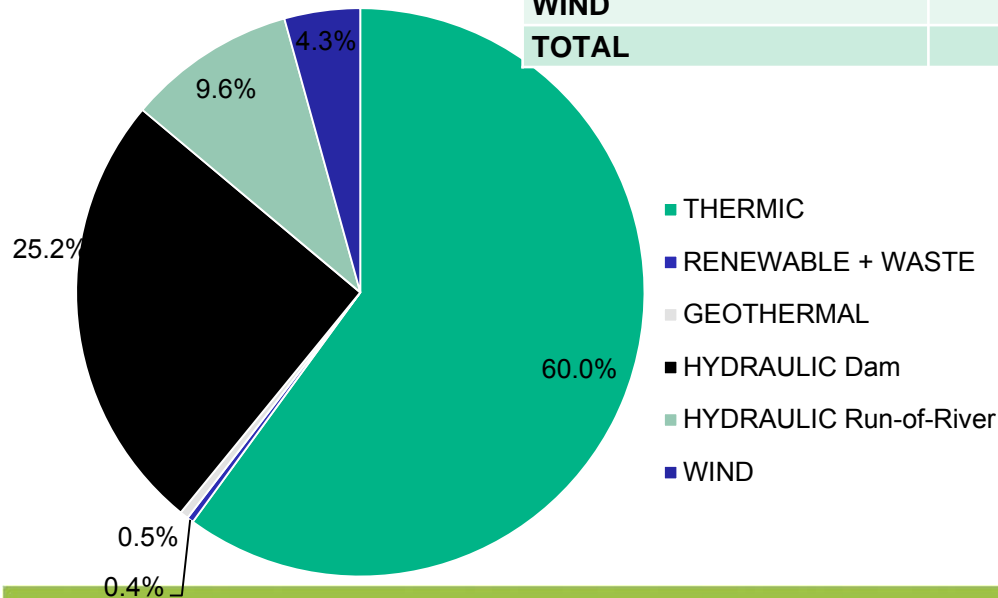
- Total primary energy supply: 115 mtoe (2011) twice the figure in 1992.
- Power demand has increased from 129,000 GWh in 2002 to 242,000 GWh in 2012 (88% increase)
- Installed capacity: 61,422 MW, (72% higher than the last decade)
- Import dependency: 72% in (primary energy supply), 59% (electricity generation).
- Natural gas: 43% of total electricity generation.
- GHG increase rate: %124 (compared to 1990 levels) - 422.4 mtCO₂e (2011)
- Total GHG emission: 369,65 million tonnes CO₂eq (1990-187 million)
- Reduction target: %7 from BAU

Population	74.9m
GDP	786.3bn USD
GDP per capita:	10.504 USD
Growth rate:	2.2% (annual GDP growth rate is %5.1 annually between 2002-2012)
Unemployment rate:	9.2%
Primary energy consumption per capita	1.39 TIO
GHG emission per capita (2009)	5.13 tonnes CO ₂ eq
Direct investment	12.6bl USD

Turkey Energy Sector Outlook

Turkey Energy Mix for Power Generation (2013):

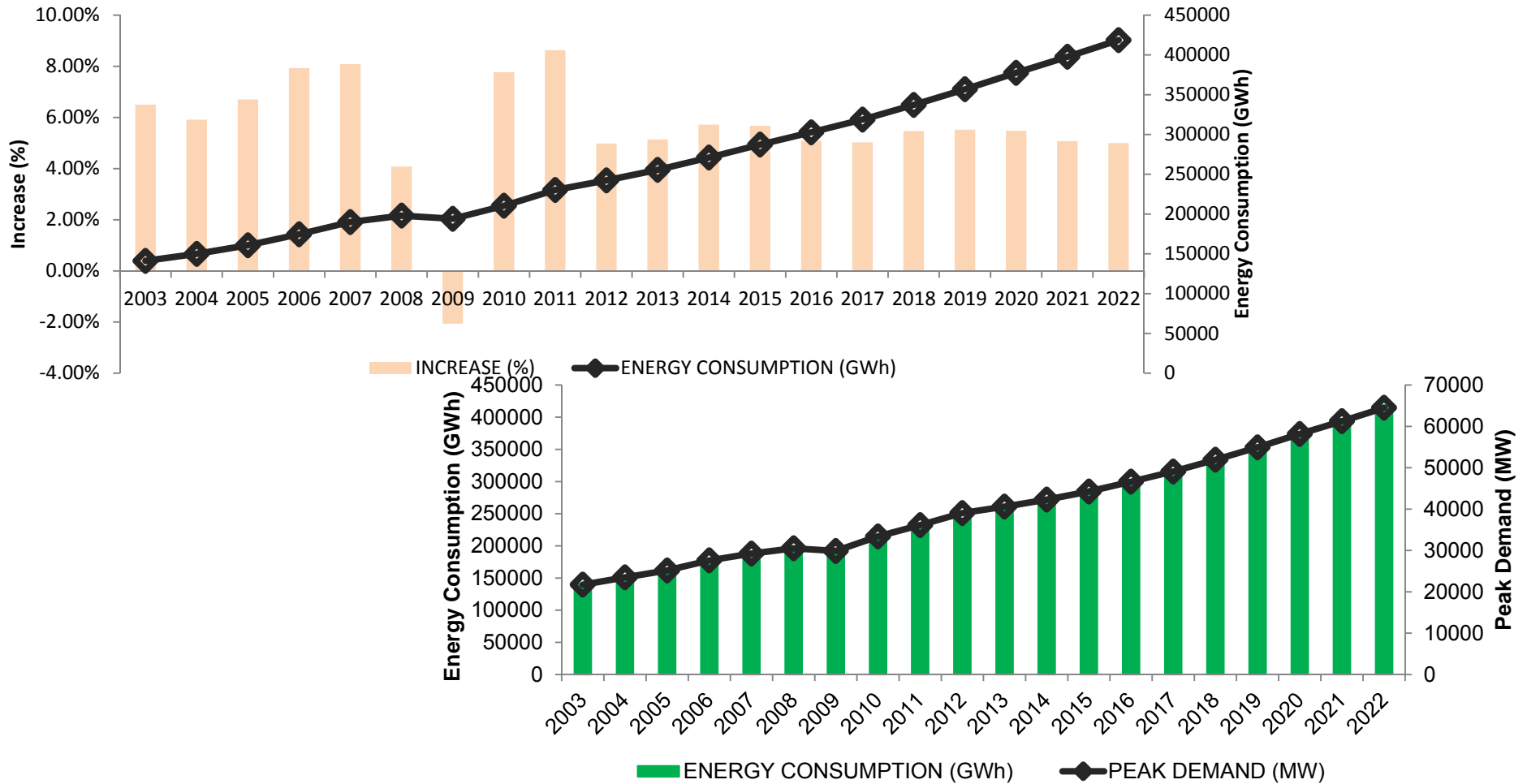
FUEL TYPE	INSTALLED CAPACITY (MW)	Percentage %	NUMBER OF PLANTS
THERMAL	38.447,6	60,0	319
RENEWABLE + WASTE	236,9	0,4	39
GEOHERMAL	310,8	0,5	13
HYDRAULIC Dam	16.142,5	25,2	74
HYDRAULIC Run-off-River	6.146,6	9,6	393
WIND	2.759,6	4,3	72
TOTAL	64.044,0	100,0	910



- ✓ Thermal Power, especially NGPP's constitutes remarkable portion of the Turkey's energy mix, inducing the current deficit of the country, and increased dependency of energy security. (%25 of current imports is of energy)
- ✓ This makes Turkish economy more fragile against global impacts.
- ✓ The mid-term policy aims to reduce the portion of NGPP in energy mix, replacing NGPP with additional hydro and coal capacity

Turkey Energy Sector Outlook

History of Energy Consumption in Turkey



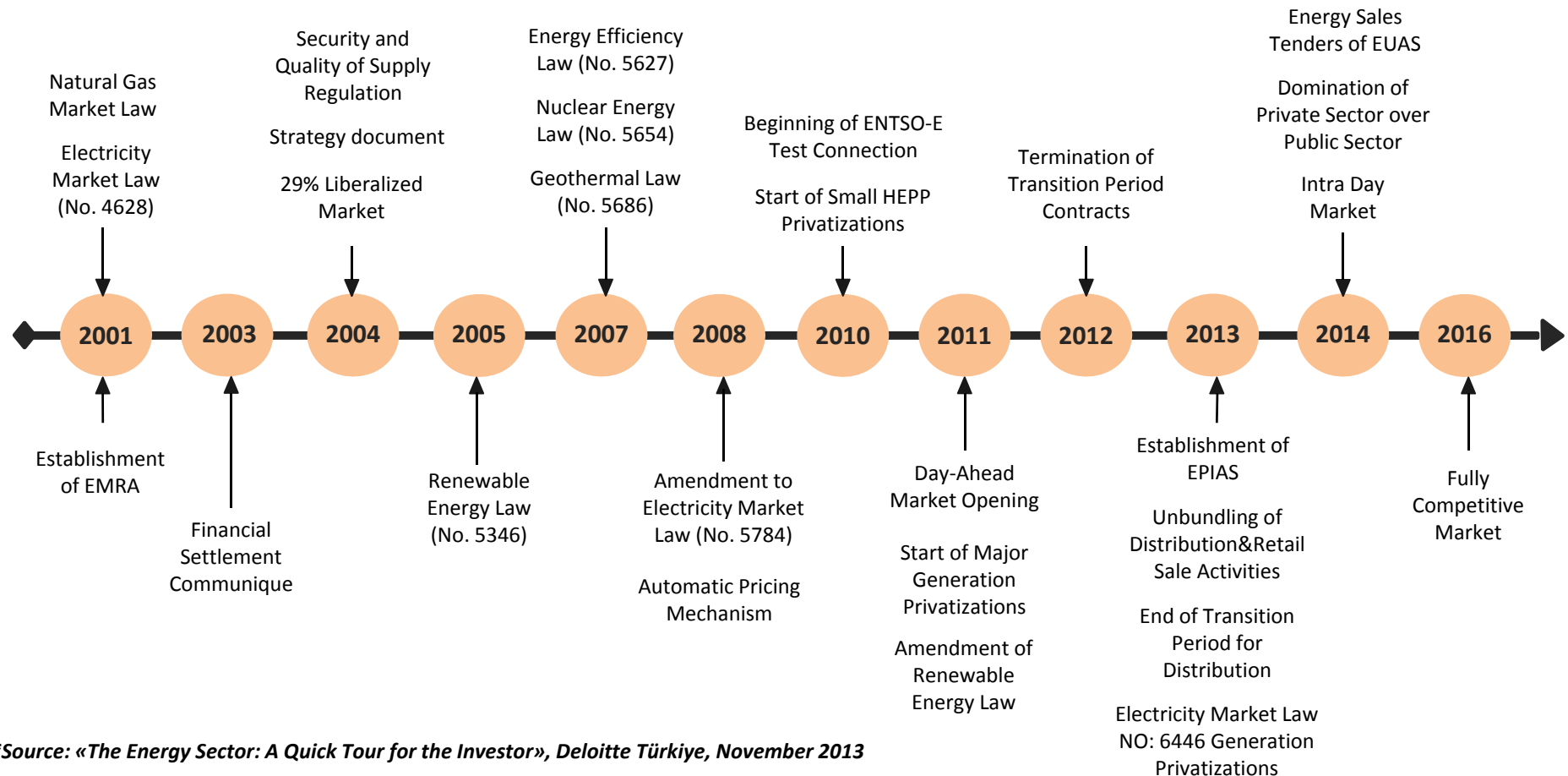
*Source: «Türkiye Elektrik Enerjisi 5 Yıllık Üretim Kapasite Projeksiyonu (2013-2017)», TEİAŞ, November 2013

GREENPEACE

www.greenpeace.org

Turkey Energy Sector Outlook

Turkish Electricity Market Reform Milestones



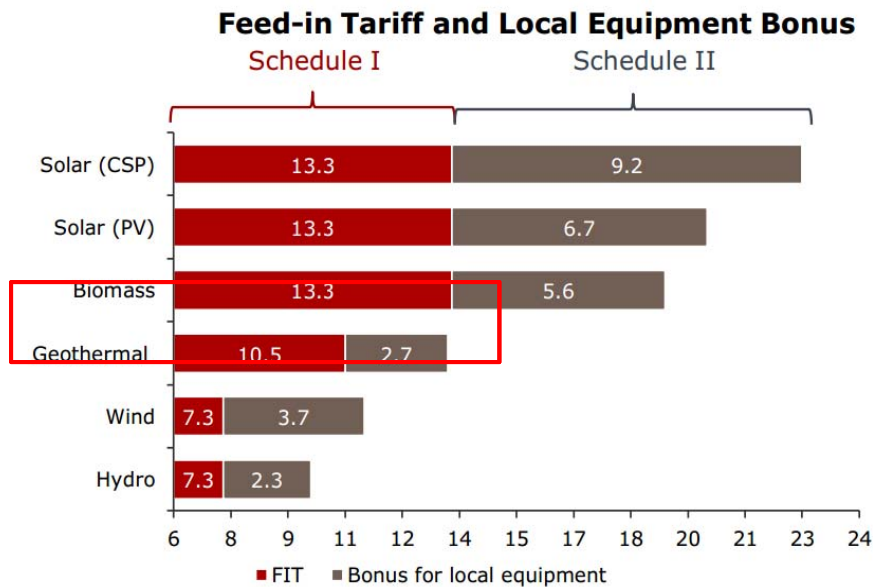
*Source: «The Energy Sector: A Quick Tour for the Investor», Deloitte Türkiye, November 2013

Turkey Energy Sector Outlook

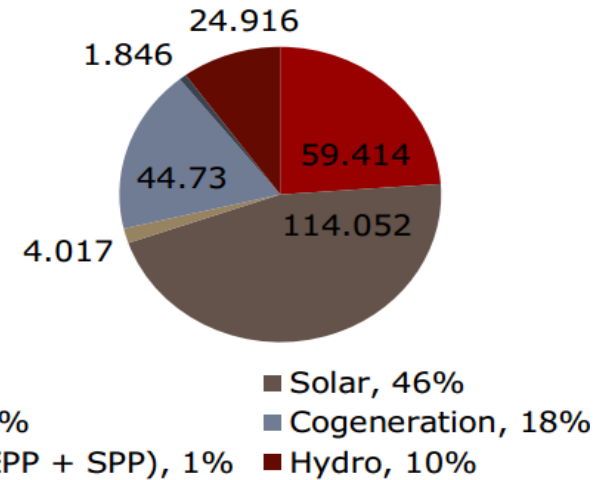
- **High Demand Growth.** 2002 and 2012 CAGR **6,2%**. An average **5%** growth is expected between **2014-2028**.
- **Low per capita consumption: 3.200kwh (OECD avg: 9.000kwh)**
- **Expanding IPP Presence.** IPPs constitute **44%** of generation. Expected to reach over **70%** with privatizations & greenfield projects.
- **Merchant Market.** No state guarantee / LT PPA – only feed in tariff for renewables (floor price)
- **Efficient Spot Market**
- **Pipeline: mostly coal-fired & renewables due to competitive advantage**

Turkey Energy Sector Outlook

Feed-in Tariff Mechanism:



Unlicensed Electricity Generation:



- ✓ Total Applications : 249 MW (as of May 2013)
- ✓ Applications for small HEPP is 10%
- ✓ The focus of investors are Solar and Wind

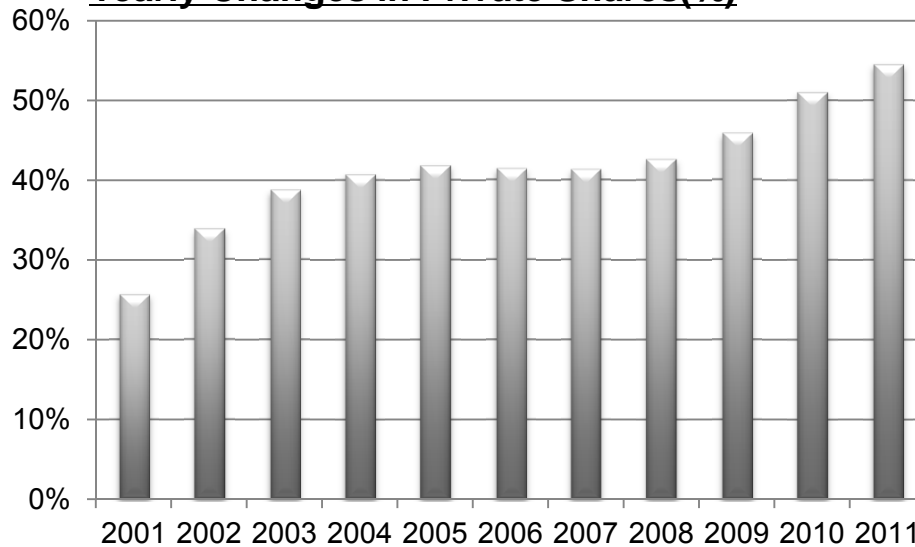
Outline

- Turkey Energy Sector Outlook
- **Privatization of Electricity Market**
- Official Energy Vision
- Future of coal
- Greenpeace Mediterranean's Works
- Greenpeace Mediterranean's Demands

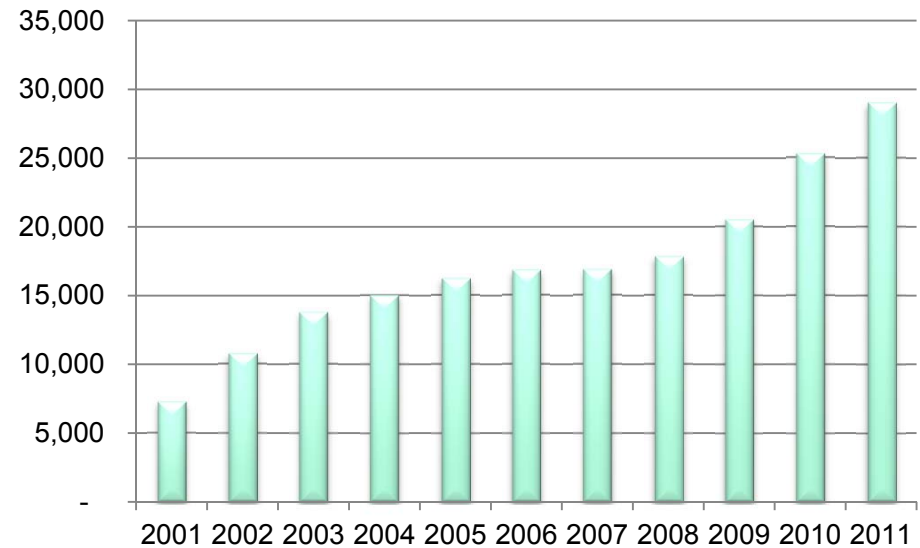
Privatization of Electricity Market

Private shares in turkish energy market

Yearly Changes in Private Shares(%)



Installed Capacity of Private Shares(MW)



- ✓ Privately owned shares in Turkish Energy market has rose to 55% from 28% in the last 10 years.
- ✓ Private companies has added an extra 22.000 MW to their installed capacities by new investments & privatizations.

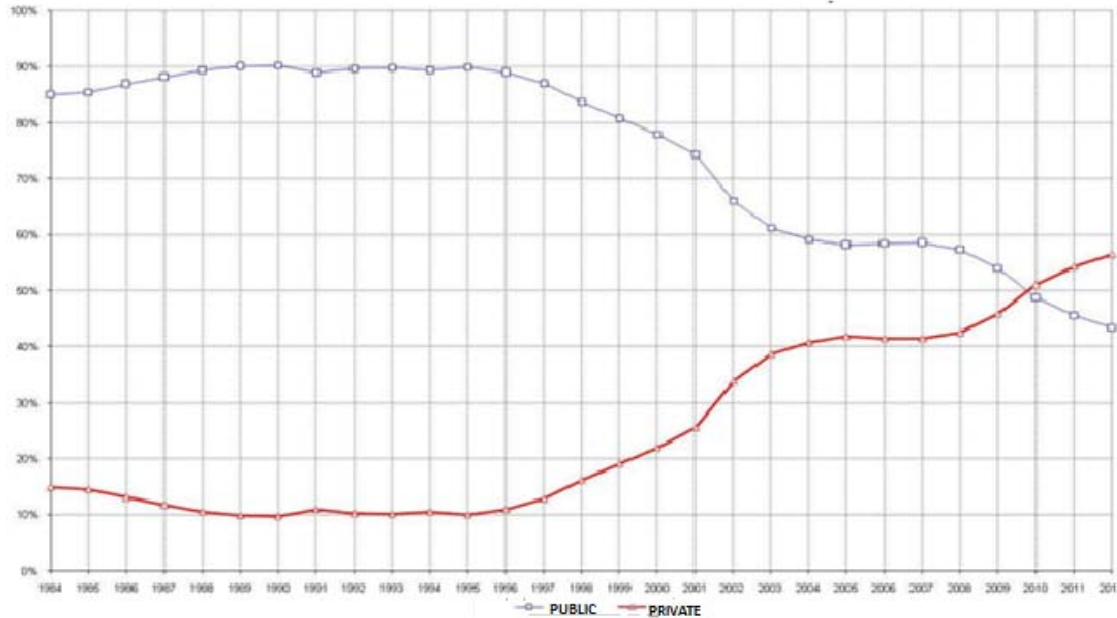
Source: EMRA

GREENPEACE

www.greenpeace.org

Privatization of Electricity Market

Development of Public-Private Shares in Generation:



- ✓ Public owned Installed capacity 24.774,7 MW (43,4 % of total capacity) **(2012)**
- ✓ Private Installed Capacity = 32.284,5 MW (56.6% of total capacity) **(2012)**
- ✓ 28 Hydro and 16 Thermal Power Plants, constituting 16.200 MW capacity owned by EUAS (public generation company) is under privatization process.

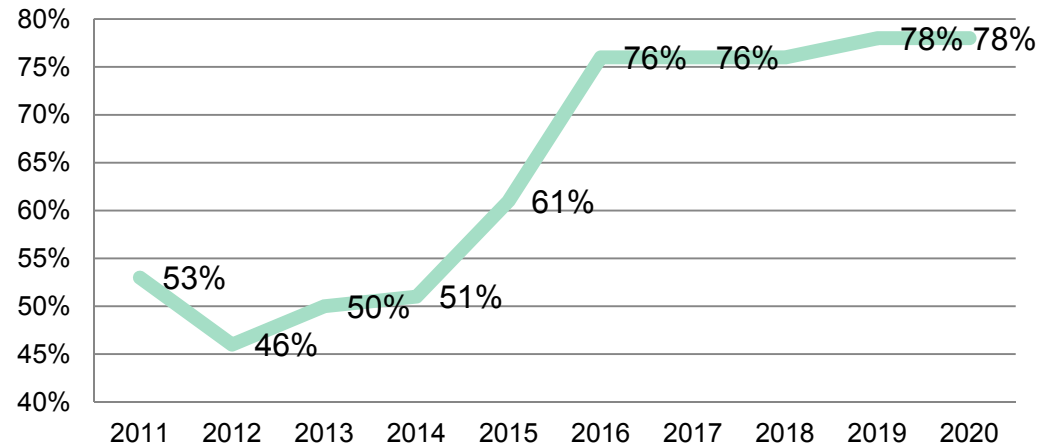
		1995	2002	2012
PUBLIC	THERMAL	9.650,6 MW	10.949,6 MW	12.560,9 MW
	HYDRO + RENEWABLE	9.207,6 MW	10.108,7 MW	12.213,8 MW
PRIVATE	THERMAL	14.40,9 MW	8.636,4 MW	22.466,2 MW
	HYDRO + RENEWABLE	655,2 MW	2.151,1 MW	9.818,4 MW

Privatization of Electricity Market

Coal Fired Power Plants to be Privatized

Thermal Power Plant	Installed Capacity	2011	2012	Average
Afşin Elbistan-A	1.355,00	27%	26%	26%
Afşin Elbistan-B	1.440,00	45%	38%	42%
Soma Termik A-B	1.034,00	55%	56%	56%
Yatağan Termik	630,00	59%	54%	57%
Kemerköy Termik	630,00	45%	52%	49%
Seyitömer Termik	600,00	74%	63%	68%
Kangal Termik	457,00	62%	28%	45%
Yeniköy Termik	420,00	71%	78%	75%
Tunçbilek Termik	365,00	56%	47%	51%
Çan Termik	320,00	76%	52%	64%
Çatalağzı Termik	300,00	76%	58%	67%
Orhaneli Termik	210,00	71%	56%	63%
Average	7.761	53%	46%	50%

Lignite Fired TPP



State GenCo EUAS was able to raise avg. capacity factor to **53%** in 2011. (exc. Afşin A, avg CF is **59%**)

In 2012, avg. capacity factor dropped to **46%** due to privatization process and coal feeding issues. (exc. Afşin A avg. CF is **51%**)

Main Assumptions:

- Naturalgas Plants will not be privatized. EUAS will operate these plants as merchant plants.
- Coal and hydro plants will be privatized by **2015**.
- Excluding Afşin A, avg. CF of coal plants will elevate to **%75-85** in 1-2 years after privatization.
- Afşin A will be refurbished in 3 years and will be operational by 2019 with **85% CF**.

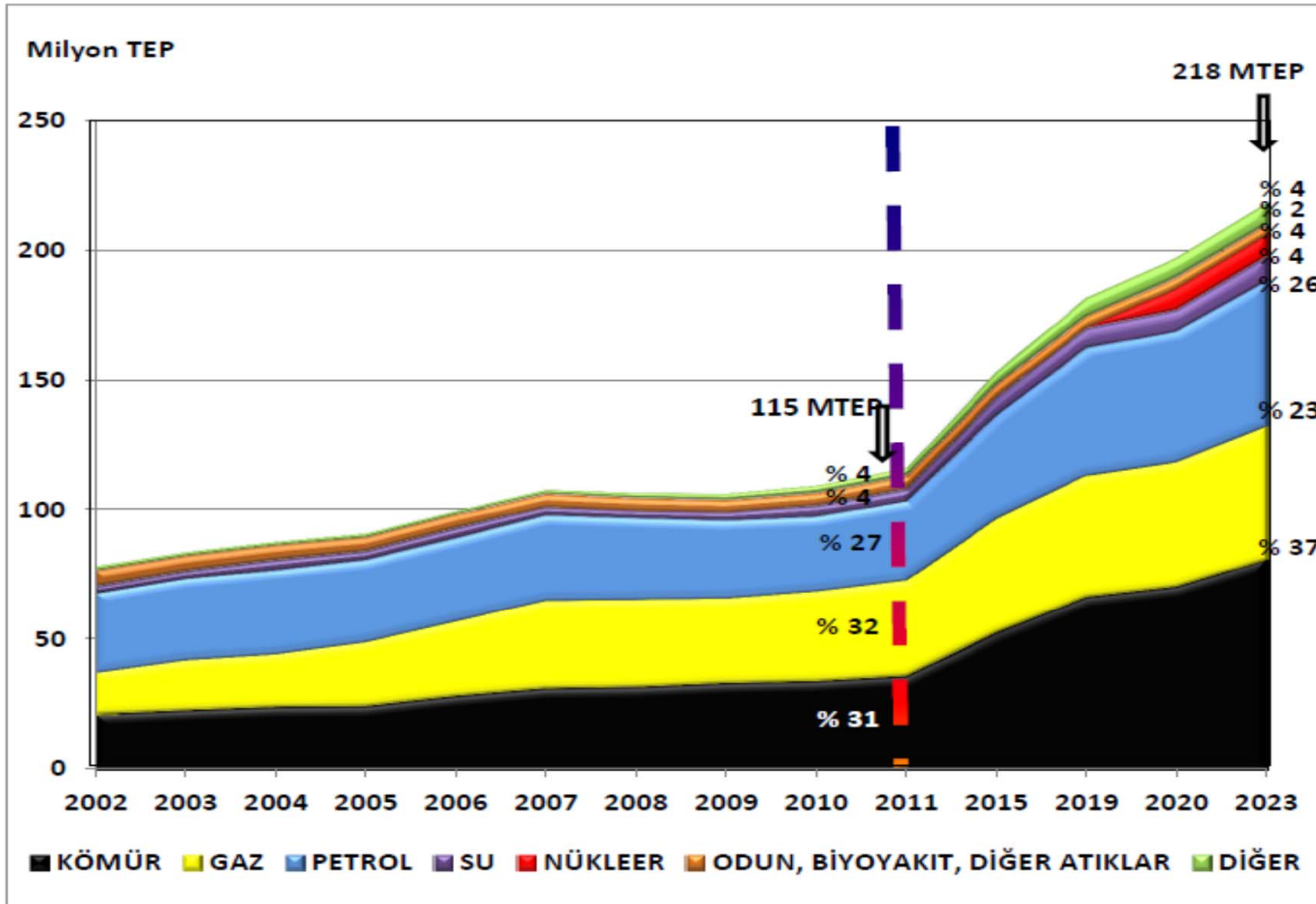
GREENPEACE

www.greenpeace.org

Outline

- Turkey Energy Sector Outlook
- Privatization of Electricity Market
- **Official Energy Vision**
- Future of coal
- Greenpeace Mediterranean's Works
- Greenpeace Mediterranean's Demands

Official Energy Vision

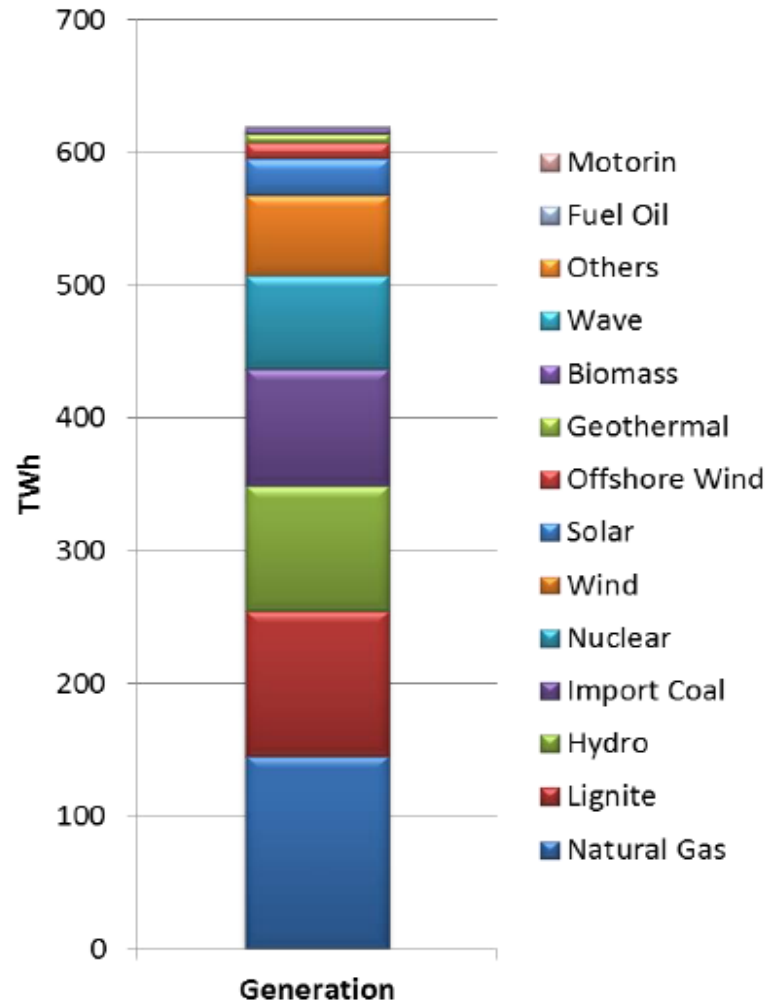


Source: Taner Yıldız (former Minister of Energy and Natural Resources), addressing the General Assembly in budget talks, 15 December 2012

GREENPEACE

www.greenpeace.org

Official Energy Vision

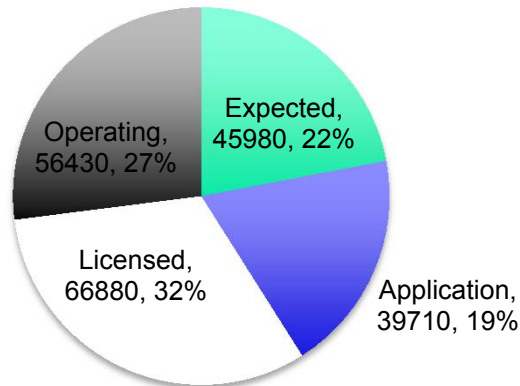


Resource	TWh	%
Coal	197	32
Natural Gas	145	23
Hydro	94	15
Wind	72	12
Nuclear	71	11
Solar	28	5
Others	12	2
Total	619	100

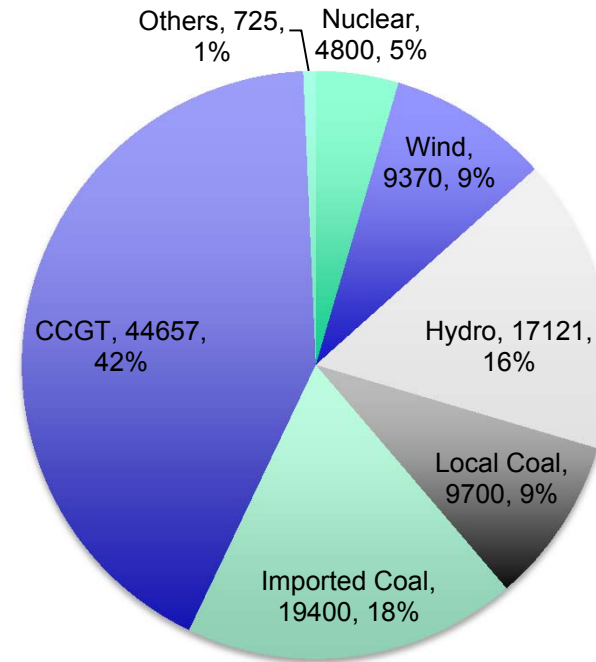
Source: Dr. Zafer Demircan. General Director of Energy Affairs, Ministry of Energy and Natural Resources. Presentation in "Wind Workshop, 26 March 2013, Ankara"

Official Energy Vision

Entire Database 209.000 MW



Licensed, Approved & Applications 107.773 MW



A shift from CCGT to coal has begun

- ✓ 2012 database: 175.000MW.
- ✓ 2013 database: 209.000MW (34.000MW increase)
- ✓ 40% (13.800MW) of 34.000MW are coal plants
- ✓ Coal project stock increased to 29.000MW from 20.000MW a year ago.
- ✓ Increase in natural gas is 3.000 MW
- ✓ No significant change in wind and hydro

Official Energy Vision

- Lifting up installed capacity to 120,000 MW
- Increasing the share of renewables to 30 percent
- Maximizing the use of hydropower
- Increasing wind power installed capacity to 20,000 MW
- Installing power plants with 600 MW of geothermal and 3,000 MW of solar energy
- Extending the length of transmission lines to 60,717 km
- Reaching a power distribution unit capacity of 158,460 MVA
- Extending the use of smart grids
- Raising the natural gas storage capacity to 5 billion m³
- Establishing an energy stock exchange
- Commissioning nuclear power plants
- **Building a coal-fired power plant with a capacity of 18,500 MW**

Source : <http://www.invest.gov.tr/en-US/sectors/Pages/Energy.aspx>

GREENPEACE

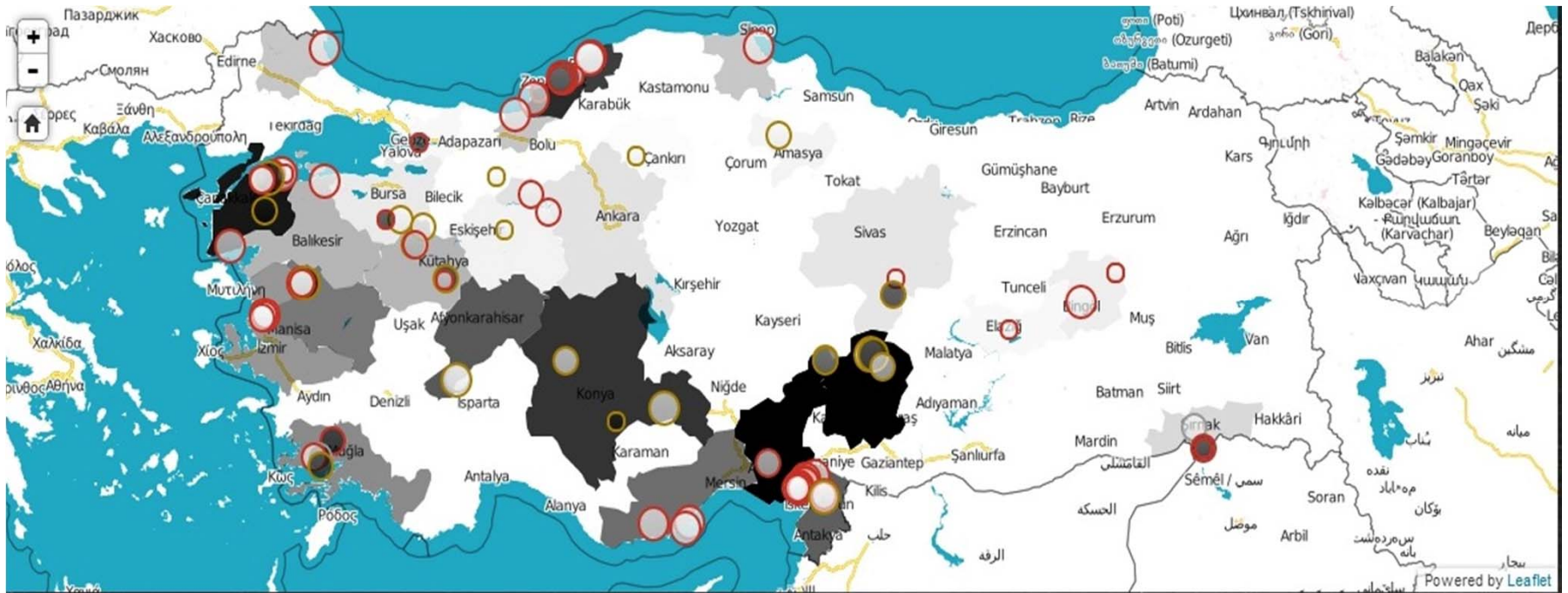
www.greenpeace.org

Outline

- Turkey Energy Sector Outlook
- Privatization of Electricity Market
- Official Energy Vision
- **Future of coal**
- Greenpeace Mediterranean's Works
- Greenpeace Mediterranean's Demands

Future of coal

- 22% of the installed capacity and 27% of total power generation
- Domestic coal projects has right to benefit from Region-5 level support instruments
- Turkish banking sector is confident to provide loans & prioritized domestic coal
- IFI's are supportive to the energy policies (mainly due to liberalizing energy market)
- 2012 has been declared as the “year of coal”



Future of coal



General Manager of EÜAŞ (Electricity Generation Corp.):
We did not pollute the atmosphere. We have to use our own coal. If I can't get it done by 2020, we will not be allowed to develop lignite due to Kyoto."

Source: www.radikal.com.tr, 12.03.2013

GREENPEACE

www.greenpeace.org

Future of coal

Top 15 countries in terms of proposed new coal power capacity



Rank	Country	Installed Capacity (MW)
1	China	558938
2	India	519396
3	Russia	48000
4	Turkey	36719
5	Vietnam	34725
6	South Africa	22623
7	USA	20236
8	Ukraine	14000
9	Poland	12086
10	Germany	12060
11	Mongolia	9660
12	Taiwan	8800
13	Indonesia	8360
14	Mozambique	6940
15	Chile	6742

Source: **World Resources Institute Working Paper, 2012. Global Coal Risk Assessment: Data Analysis and Market Research.**
http://pdf.wri.org/global_coal_risk_assessment.pdf

Future of coal

Top 15 countries in terms of proposed new coal power capacity – per capita

Rank	Country	Per capita installed capacity (MW)	Per capita installed capacity (kW)
1	Mongolia	0,003530702	3,530701754
2	Turkey	0,000489587	0,489586667
3	South Africa	0,000443588	0,443588235
4	India	0,000429253	0,429252893
5	Chile	0,000421375	0,421375
6	China	0,000412805	0,412805022
7	Vietnam	0,000399138	0,399137931
8	Taiwan	0,000382609	0,382608696
9	Russia	0,000334962	0,334961619
10	Poland	0,000318053	0,318052632
11	Ukraine	0,000311111	0,311111111
12	Mozambique	0,000301739	0,30173913
13	Germany	0,000148889	0,148888889
14	USA	6,42413E-05	0,06424127
15	Indonesia	3,52743E-05	0,035274262

Future of coal

Announced Power Plant

Afşin-Elbistan C-D-E-G Termik Santrali
Konya Karapınar Termik Santral
Afyon Dinar Termik Santral
Zorlu Kömür Santrali
Babadere Elektrik Santrali
Bandırma Elektrik Santrali
Hema Entegre Termik Santrali
Mersin Eren Termik Santrali
Şevketiye Lapseki Termik Santrali
Yeşilovacık Termik Santrali
Soma Termik Santrali
Adana Termik Santral
Bingöl Termik Santrali
Saltukova Enerji Santrali Projesi
Eskişehir Termik Santral
Kütahya Domaniç Termik Santral
Kütahya Termik Santral
Muğla Termik Santral
Bursa Termik Santral
Karlıova Termik Santral
Çırpılar Termik Santrali
Çan-2 Termik Santrali

Ins. Cap. MW

8.000,00
5.000,00
3.500,00
2.480,00
1.600,00
1.600,00
1.320,00
1.320,00
1.320,00
1.320,00
720,00
600,00
500,00
350,00
300,00
300,00
300,00
300,00
270,00
240,00
150,00
140,00
31.630,00



GREENPEACE

www.greenpeace.org

Future of coal

Afsin Elbistan Power Plant

Status of the plant:	2 operating Units, 4 new Units of 8000 MW announced
Type:	Lignite (1050 kcal/kg) - Estimated to hold 46 per cent of Turkey's 12.4bn tonnes of lignite reserves, the Afsin Elbistan field is large by any standard.
Capacity:	~8000 (Units A,B,C,D and E)
Firm/Consortium:	TAQA of United Arab Emirates announced that they postponed their final decision in the project. Official statement by former Minister of Energy, Taner Yildiz: new talks has begun with China and South Korea for the same project.
Significance	Important project based on size (8000, biggest) and mine as it has nearly half of the lignite reserves of Turkey. Expected rehabilitation cost for Unit A at around 4bn us\$, additional capacity of 680MW, 2 bn us\$ 2400 people to be resettled for Unit C 27 mn m2 field to be nationalized 7000 people to be resettled for Unit D 60 mn m2 field to be nationalized for Unit E

GREENPEACE

www.greenpeace.org

Afsin Elbistan Power Plant



GREENPEACE

www.greenpeace.org

Future of coal

Konya Karapinar Power Plant

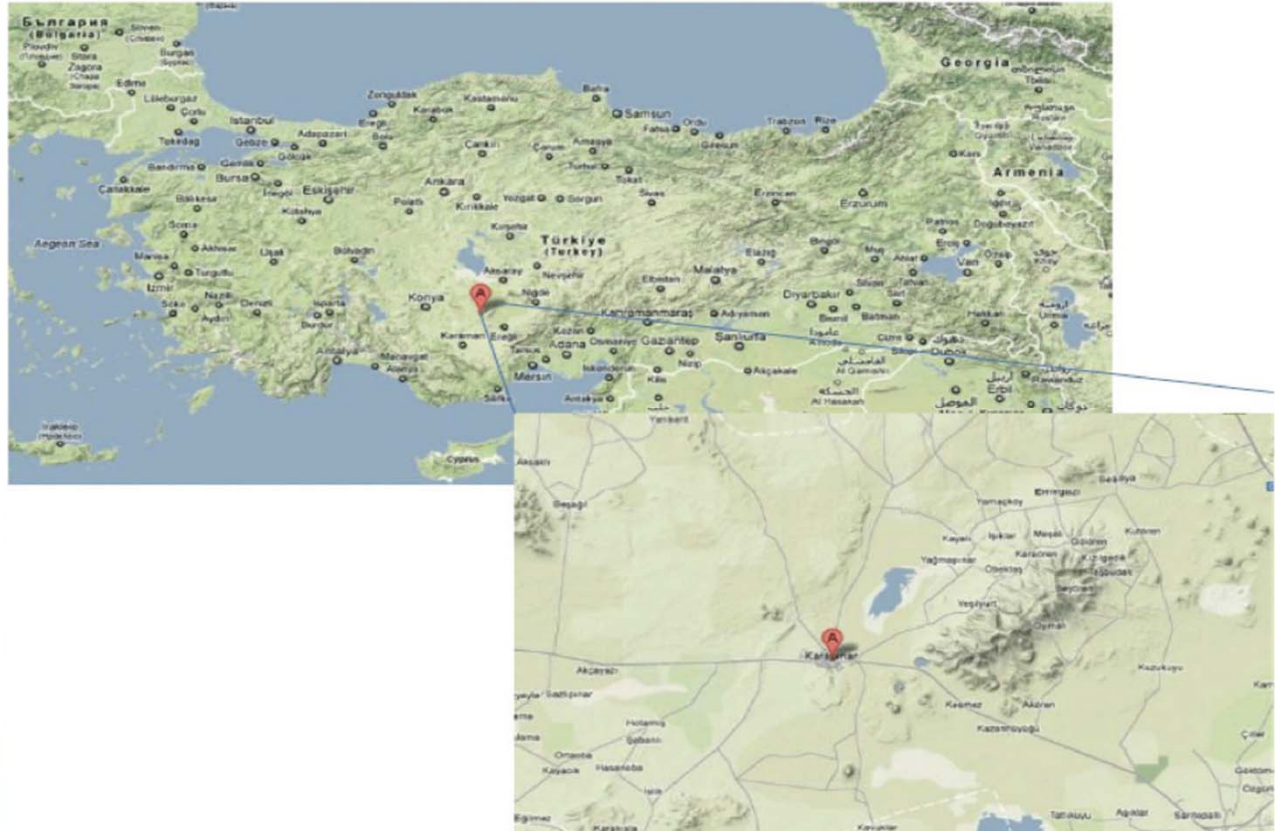
Status of the plant:	Announced, 5.947,62ha land for open pit mining in EIA application.
Type:	Lignite (1375 kcal/kg) - MTA data on the coal mine in Karapinar indicate that the proven lignite reserve in the region accounts for 1.832 billion tons. According to the Electricity Generation Company (EUAS) data, 1.58 billion tons of the total proven lignite will be supplied through open-pit mining, while 250 million tons will be extracted through underground mining.
Capacity:	~5000 (5870MW EUAS / 5250MW MTA)
Firm/Consortium:	Tbd, ACWA Power-EUAS mou (26.11.13). The preliminary agreement covers the technical feasibility studies for developing the Karapinar coal fields. The cost of developing and generating power from the Karapinar coal fields is estimated as USD 10 billion (source: Sabah newspaper, no information on official websites).
Significance	<p>Important project based on size (5000, 2nd biggest after Afsin-Elbistan) and land (main agricultural land in Turkey, high agricultural biodiversity and agricultural crops) – 60.000 people employed in agriculture in the field.</p> <p>Extraction of the coal reserve in Karapinar and its combustion at the thermal power plant would cause emission of 1.85 billion tons of carbon dioxide equivalent, which is 4.4 times of total greenhouse gas emissions recorded in Turkey in 2010.</p> <p>It has been calculated by TEMA for an installed capacity of 5,870 MW, it would be required to use 2,776,744,800 m³ /year of cooling water (higher than the underground reserve, no room for agricultural irrigation)</p> <p>Good case for solar versus coal: 2000MW PV planned, 60 million m² available for solar investments, 57 companies conducting assessments.</p>

GREENPEACE

www.greenpeace.org

Future of coal

Konya Karapınar Power Plant



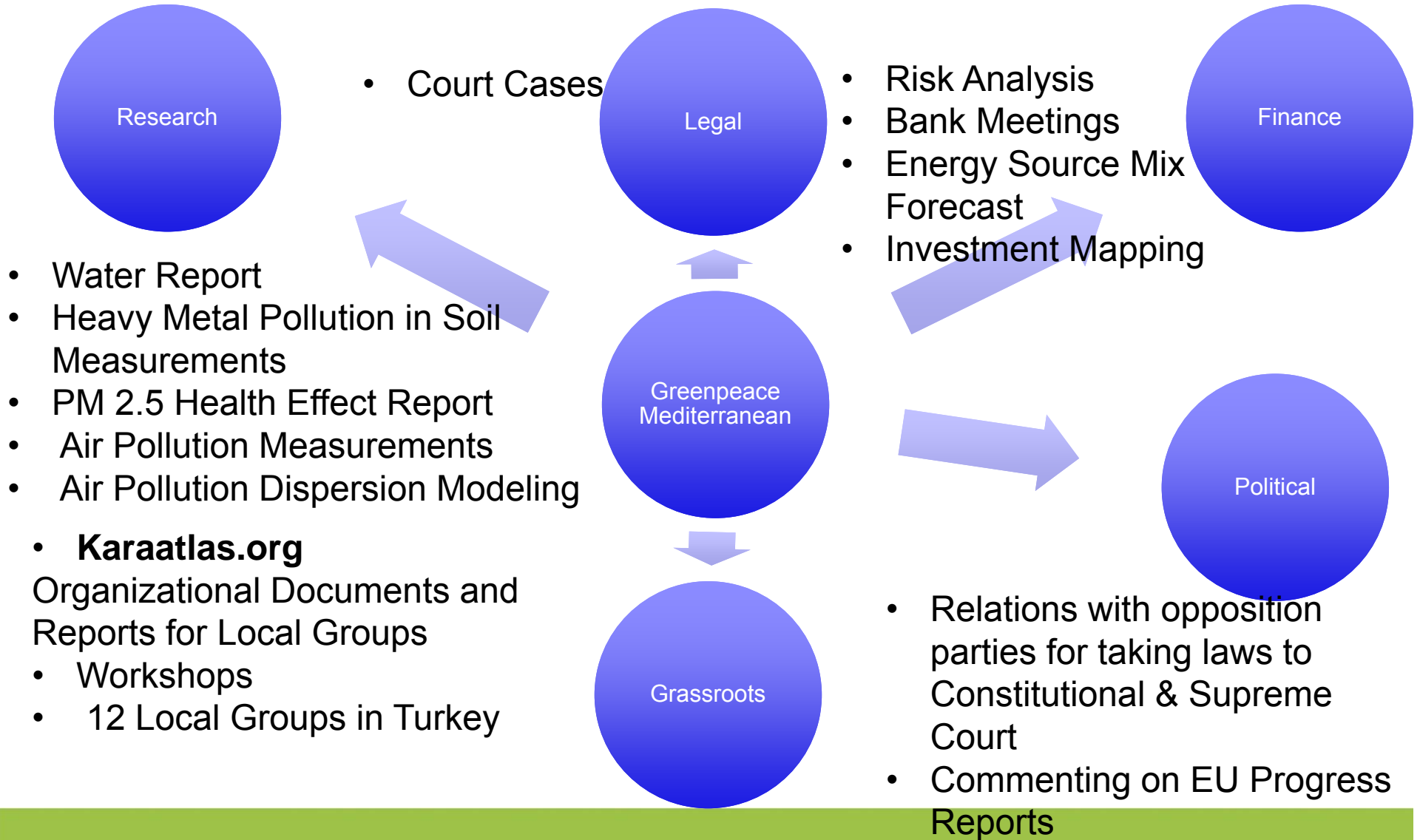
GREENPEACE

www.greenpeace.org

Outline

- **Turkey Energy Sector Outlook**
- **Privatization of Electricity Market**
- **Official Energy Vision**
- **Future of coal**
- **Greenpeace Mediterranean's Works**
- **Greenpeace Mediterranean's Demands**

Greenpeace Mediterranean's Works



GREENPEACE

www.greenpeace.org

Greenpeace Mediterranean's Works



SERKAN OCAK / RADİKAL

Gerze Termik Santrali ormana takıldı

Sinop'un Gerze ilçesinde yıllardır tartışma konusu olan termik santral projesi 'orman' takıldı. Orman ve Su İşleri Bakanlığı'nun Ormanlık alanda termik olmaz' kararı nedeniyle Anadolu Grubu tarafından hazırlanan Çevresel Etki Değerlendirme (CED) raporu iade edildi. **Termik santralin** karşı 4 saat nöbet tutan köylüler bu elismeyi büyük zafer olarak değerlendirip kutlama yaptı.

Anadolu Grubu, Gerze'nin Yaykıl Köyü'nden 3 yıl önce 200 megawat gücünde **termik santral** yapımı için arazi satın aldı. İthal kömürle çalışacak, kül depolama tesisi ile bir de limanı olacak Gerze Enerji Santrali projesi için CED süreci başladı. CED süreci çerçevesinde Orman ve Su İşleri Bakanlığı'ndan görüş alındı. Bakanlık, proje alanının orman vasisi' tasfiğini, ormanlık alanda termik santralin alan niteliklerini yer alamayacağını belirtti. Anadolu Grubu, 2011, 2012 ve 2013'te ayrı ayrı 3 kez CED raporu hazırlayarak Çevre ve Şehircilik Bakanlığı'na sundu. Ancak bakanlık 3 raporu da geri çevirdi. Çevre ve Şehircilik Bakanlığı Çevresel Etki Değerlendirme İzin ve Denetim Genel Müdürlüğü'nün en son 2 Ağustos 2013 tarihli yazısında, projenin orman alanında olduğu vurgu yaptı. Bu durumun düzeltilmeden CED sürecine başlanamayacağı vurgulanan belge ile birlikte Anadolu Grubu'nun hazırladığı CED raporu iade edildi.

Gerze, termik santrali yendi



TÜRKİYE'nin termik santral kurulması planlanan 64 noktasından birisi Sinop'ta bulunan Gerze'ye bağlı Yaykıl köyü idi. Termikçi girketse Anadolu Grubu. Anadolu Grubunun, Çevre ve Şehircilik Bakanlığının CED raporu almak için yaptığı başvuru, bakanlığın "CED dosyası iade edilmiştir" cevabıyla son buldu. Böylece Sinop halkının tüm ilçe ve çevre illerle dayanışma içinde sürdürülen yaklaşık 5 yıllık direnişi sonucu şirket Sinop'u terk etmek zorunda kaldı.

Sinop'ta termik santrale karşı Yeşil Gerze Çevre Platformunun çağrısıyla binlerce kişinin katıldığı mitingler yapılmış, şirketin gence yarısı, gizli ve yasa dışı sondaj çalışması binlerce insanın müdahalesiyle engellenmişti. Gerze halkı, kararın açıklanmasının ardından iki gündür elde ettikleri kazanımı davul ve zurna eşliğinde kutluyor. (Sinop/EVRENSEL)



Bakanlık: Gerze'ye termik santral olmaz

Anadolu Elektrik Üretim AŞ., 3 yıl önce Sinop Gerze'deki Yaykıl Köyü'nde termik santral yapmak için arazi almıştı. Yöre halkı ve çevreciler buna karşı çıkmıştı. Termik santral için Çevre Etki Değerlendirme (CED) raporu hazırlanırken Orman ve Su İşleri

Bakanlığı'na görüşü soruldu. Bakanlık bölgenin ormanlık olduğunu belirterek "Ormanlık alanda termik santral olmaz" dedi. Son olarak Çevre ve Şehircilik Bakanlığı projenin ormanlık alanda olduğunu belirterek CED raporunu onaylamadı.



Greenpeace, Gerze halkına www.kimkorkar.org sitesi üzerinden destek verdi.

Direnen Gerze kazandı

Sinop-Gerze Anadolu Grubu'nun Sinop'un Gerze ilçesine kurmak istediği kömürlü termik santral projesinin Çevresel Etki Değerlendirmesi (CED) raporu, Çevre ve Şehircilik Bakanlığı tarafından şirkete geri iade edildi. Anadolu Grubu'nun hazırladığı Çevresel Etki Değerlendirmesi Raporu'nu 4. kez şirkete iade eden Bakanlık, hem proje sahası içinde hem de yakın çevrede orman alanı bulunması nedeniyle CED sürecinin yeniden başlatılmasını uygun görmedi. 100 dönüm orman arazisi içerisinde yer alan proje, 4. kez bu sebeple geri iade ediliyor. Bu karardan sonra sürecin artık devam etmeyeceği ön görülüyor. Gerze halkı termik santral planına karşı 5 yıldır direniyor. TARAF

GREENPEACE

www.greenpeace.org

Greenpeace Mediterranean's Works



GREENPEACE

www.greenpeace.org

Outline

- **Turkey Energy Sector Outlook**
- **Privatization of Electricity Market**
- **Official Energy Vision**
- **Future of coal**
- **Greenpeace Mediterranean's Works**
- **Greenpeace Mediterranean's Demands**

Greenpeace Mediterranean's Demands

- Climate change mitigation as an integral part of energy policy
- Long term energy vision and strategy (post 2023)
- There is a choice to make: renewables vs. fossil fuels
- Increasing efficiency
- Managing the demand: ambitious energy efficiency targets
- Recognize the increasing competitiveness of renewables

GREENPEACE

www.greenpeace.org

Thank you for your attendance.

GREENPEACE

www.greenpeace.org