



TÜRKİYE CUMHURİYETİ  
CUMHURBAŞKANLIĞI  
**YATIRIM  
OFİSİ**

**INVEST IN  
TÜRKİYE**

# **NEW PROJECTS & OPPORTUNITIES IN TURKISH ENERGY SECTOR**

## AGENDA

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- **Turkey Energy Market Outlook**
- **Vision Beyond 2020s**
- **Turkey's Renewable Energy Market**
- **Natural Gas Market**
- **Green Electricity and Hydrogen Energy Potential**
- **Energy Investment Incentives**
- **Success Stories**



# TURKEY

5<sup>TH</sup>

LARGEST ELECTRICITY  
MARKET IN **EUROPE**

5<sup>TH</sup>

LARGEST ENERGY CONSUMER  
IN **EUROPE**

4<sup>TH</sup>

LARGEST GAS CONSUMER IN  
**EUROPE**



GEOGRAPHIC PROXIMITY TO  
**73% OF WORLD'S OIL  
AND GAS RESERVES**



AMONG THE WORLD'S  
LARGEST GROWING  
**RENEWABLE ENERGY  
MARKETS**



# ELECTRICITY MARKET OUTLOOK



**96 GW**

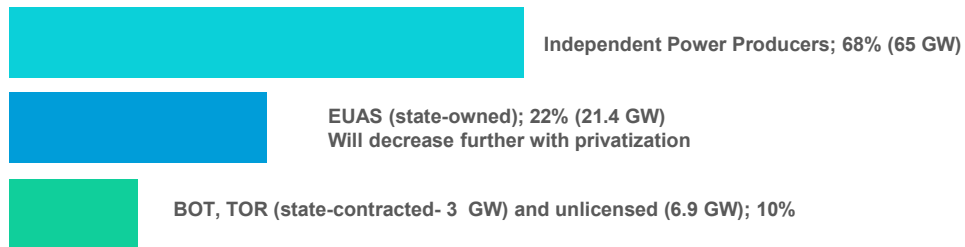
Total installed capacity by end-2020



5 GW up from 2019

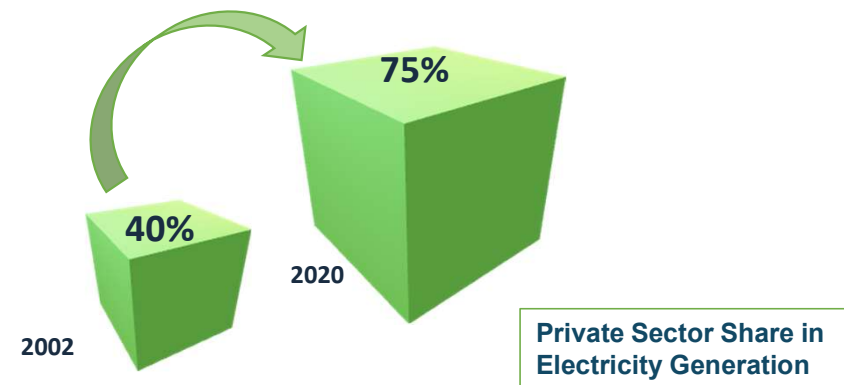
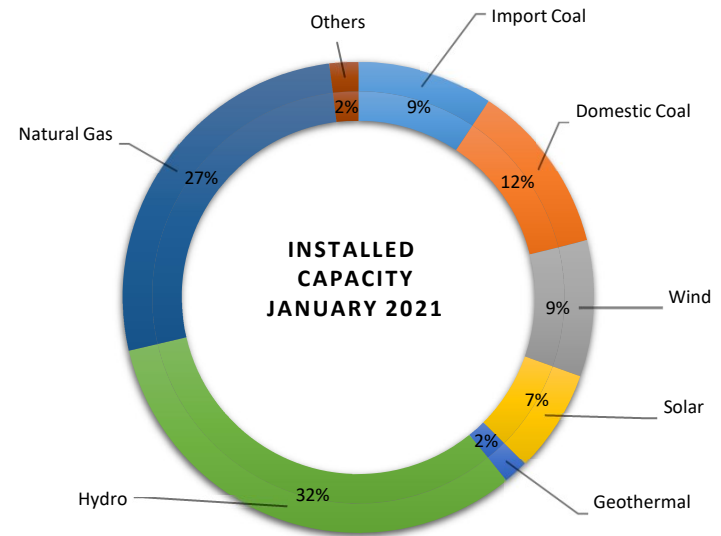
**5<sup>th</sup> largest  
electricity  
market in Europe**

## Installed Power Breakdown by Generators



Source: TEIAS Monthly Market Report, January 2021

**305 bn kWh consumption**



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## POWER VISION BEYOND 2020s

TURKEY HAS A SERIES OF AMBITIOUS  
TARGETS FOR BEYOND 2020S...



✓ Increasing Share of Domestic and Renewable Energy in Power Generation to 2/3 by 2023



✓ Increasing Hydropower Installed Capacity to 34 GW by 2023

✓ Increasing Wind Installed Capacity to 16 GW by 2027



✓ Increasing Solar Installed Capacity to 16 GW by 2027

✓ Increasing Geothermal Installed Capacity to 4 GW by 2023



✓ Extending Use of Smart Grids

✓ Extending utilization of natural gas in all cities by 2023



✓ Commissioning One Nuclear Power Plant by 2023

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## RENEWABLE MARKET

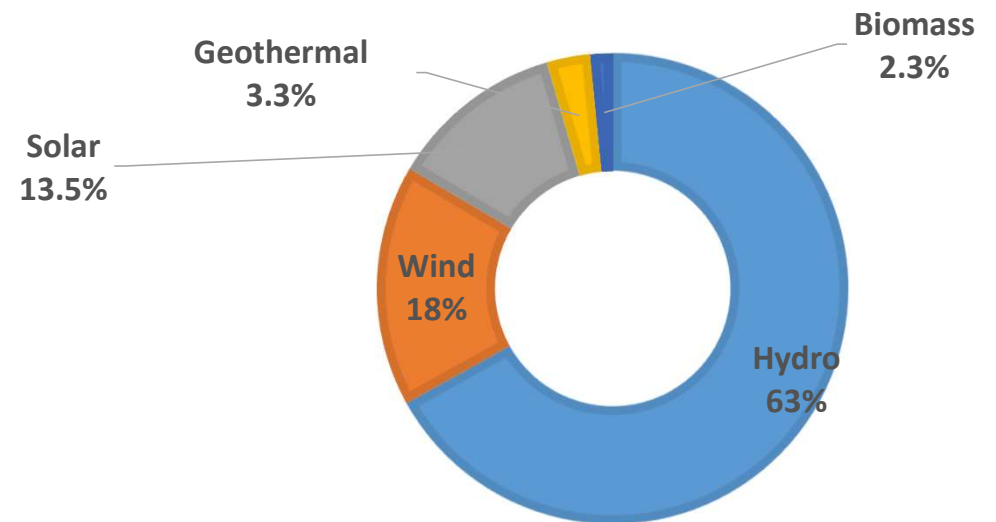


WIND AND SOLAR CAPACITIES WILL INCREASE TO AT LEAST 16 GW EACH UNTIL 2027

### INSTALLED CAPACITY OF RENEWABLES (END-2020)

Source	Installed Capacity (MW)	Ratio to Total Installed Capacity (%)
Hydro	30,984	27
Wind	8,832	8
Solar	6,667	4
Geothermal	1,613	3
Biomass	1,116	1.5

### RENEWABLE RATIOS 2020



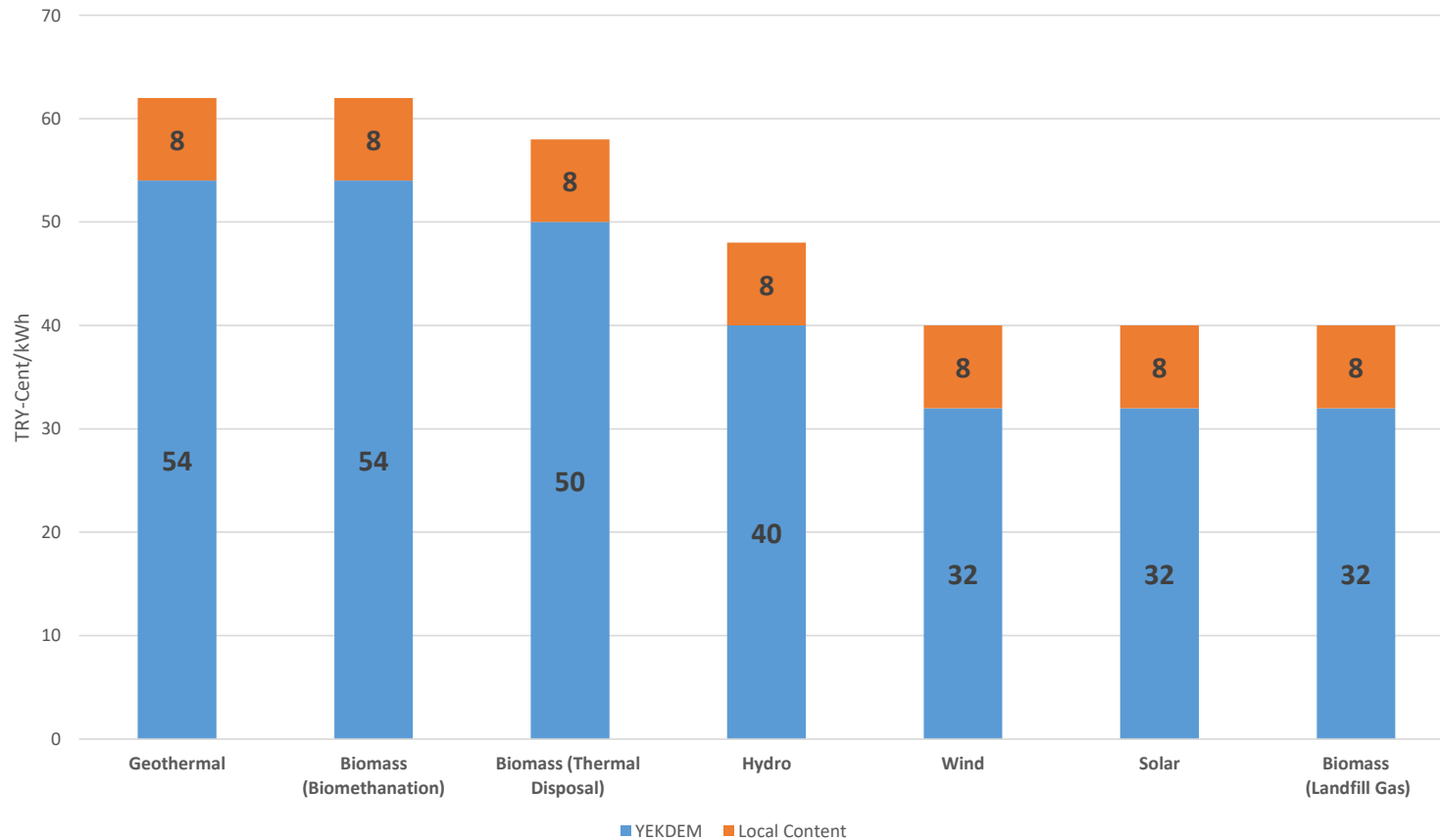


# THE NEW YEKDEM MECHANISM

FEED-IN-TARIFF STRUCTURE AS PRICE CAPS

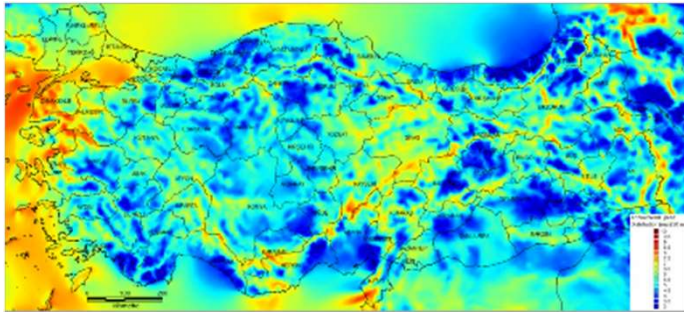


## RENEWABLES FEED-IN-TARIFF SCHEMES



## WIND ENERGY

## TURKEY WIND MARKET OUTLOOK-ROAD TO 16 GW BY 2027



**37 GW ONSHORE POTENTIAL** with  
over 7m/s wind speed at 50m  
**11 GW OFFSHORE WIND  
POTENTIAL**

**FIT at 32 TRY-cents/kWh for  
10 years +  
Local content FIT  
at 8 TRY-cents/kWh for 5 years**

**ON-SITE MEASUREMENT  
IS CRITICAL**

On-site data measurement of  
minimum one year  
is required in pre-license  
applications

	UNLICENSED MARKET	LICENSED MARKET	YEKA
<b>Capacity Threshold</b>	< 5MW	> 5MW	> 5MW
<b>Location</b>	Based on DisCo capacity	Based on TEIAS capacity	Renewable Energy Resource Zones
<b>Electricity sales</b>	FIT via authorized supply company	Spot market at FIT	Fixed price identified in reverse-auction
<b>FIT Application timeline</b>	Apply to DisCo's with no specific timeline	Apply to YEKDEM in October	-
<b>Auction model</b>	No auction	Reverse auction	Reverse auction
<b>Local content</b>	-	Extra FIT	-
<b>Installed capacity (as of January 2021)</b>	71 MW	8437 MW	-

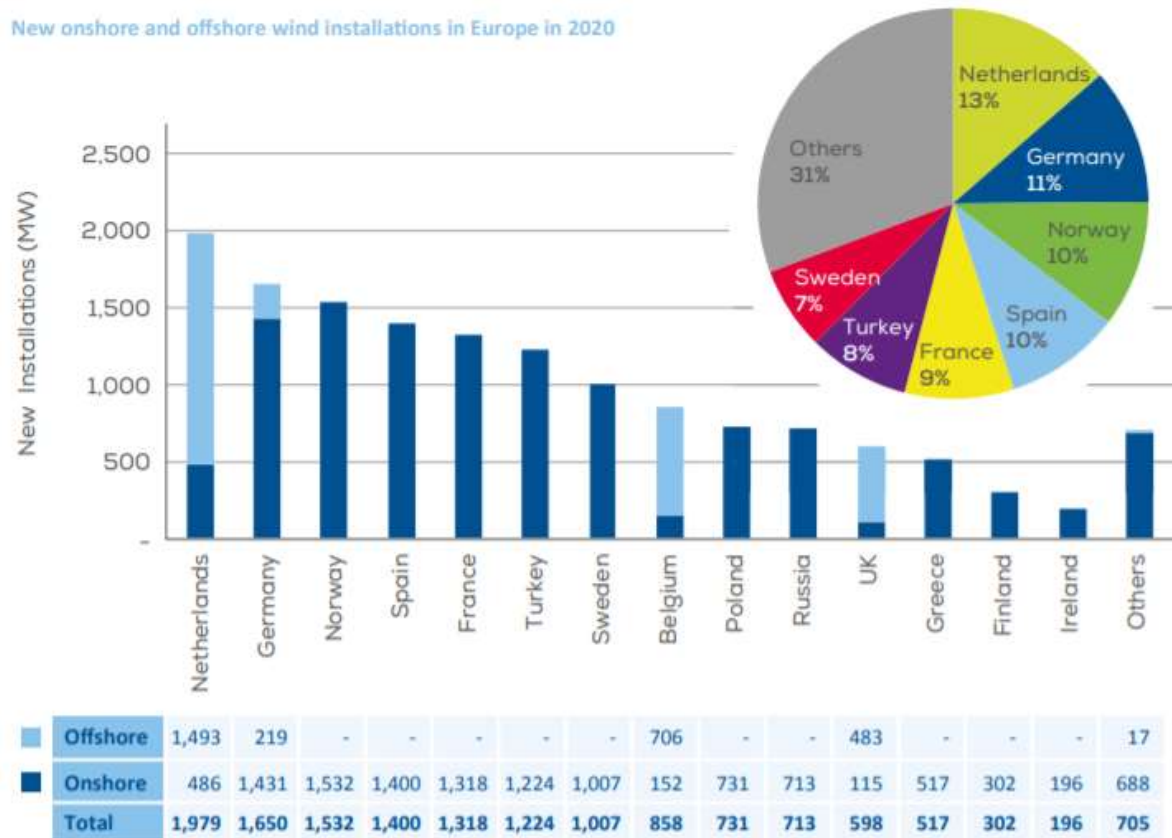
## WIND ENERGY

ONE OF THE PROMINENT MARKETS



Turkey stands among the key European countries ambitiously raising its wind power installed capacity...

New onshore and offshore wind installations in Europe in 2020



Source: WindEurope

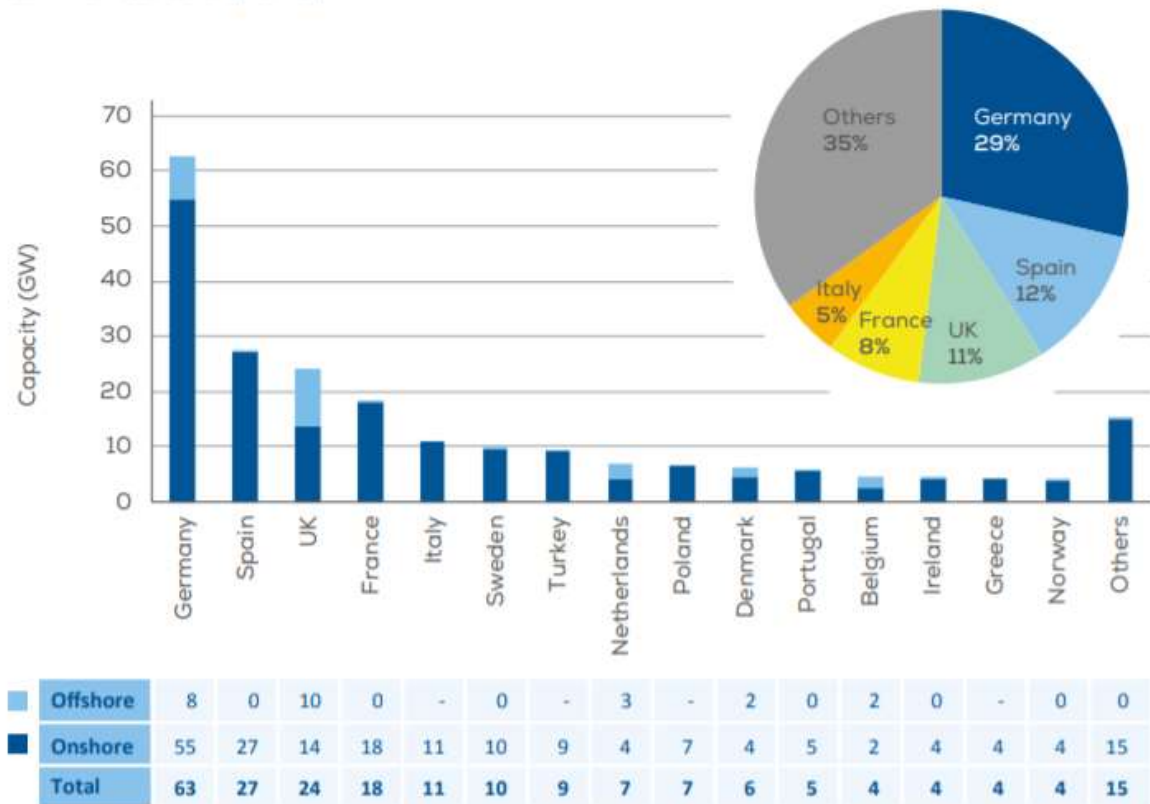
# WIND ENERGY

ONE OF THE PROMINENT MARKETS



Turkey stands among the key European countries ambitiously raising its wind power installed capacity...

Total wind installations by country

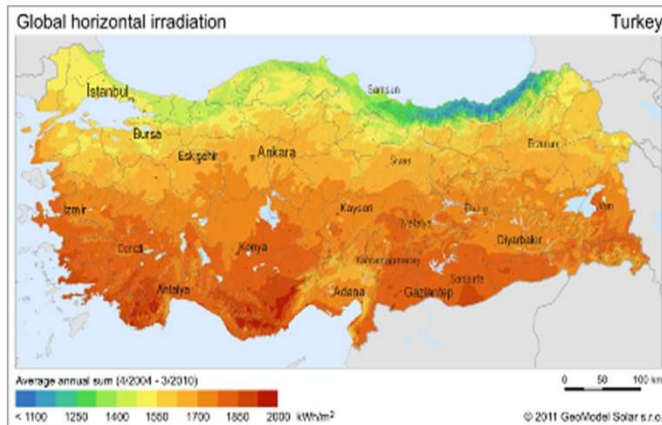


Source: WindEurope



# SOLAR ENERGY

TURKEY SOLAR MARKET OUTLOOK-ROAD TO 16 GW BY 2027



**STRONG POTENTIAL**  
with avg. annual irradiation of  
**1.7-2 MWh/m2**

**FIT at 32 TRY-cents/kWh for 10  
years + Local content FIT at 8  
TRY-cents/kWh for 5 years**

**LAND CLASS  
IDENTIFICATION IS CRITICAL**

LAND SHOULD BE 'DRY  
MARGINAL AGRICULTURAL  
LAND' FOR GROUND-MOUNTED  
INSTALLATIONS

	UNLICENSED MARKET	LICENSED MARKET	YEKA
<b>Capacity Threshold</b>	< 5MW	> 5MW	> 5MW
<b>Location</b>	Based on DisCo capacity	Based on TEIAS capacity	Renewable Energy Resource Zones
<b>Electricity sales</b>	FIT via commissioned supply company	Spot market at FIT	Fixed price identified in auction
<b>FIT Application timeline</b>	Apply to DisCo's with no specific timeline	Apply to YEKDEM in October	-
<b>Auction model</b>	No auction	Reverse auction	Reverse auction
<b>Local content</b>	-	Extra FIT	-
<b>Installed capacity (as of January 2021)</b>	<b>6360 MW</b>	<b>446 MW</b>	-

## HYDRO POWER ENERGY

TURKEY HYDROPOWER MARKET TO 34 GW BY 2023



### 34 GW-2023 TARGET

**FIT at 40 TRY-cents/kWh for 10 years +  
Local content FIT at 8 TRY-cents/kWh for 5 years**

#### LICENSED MARKET

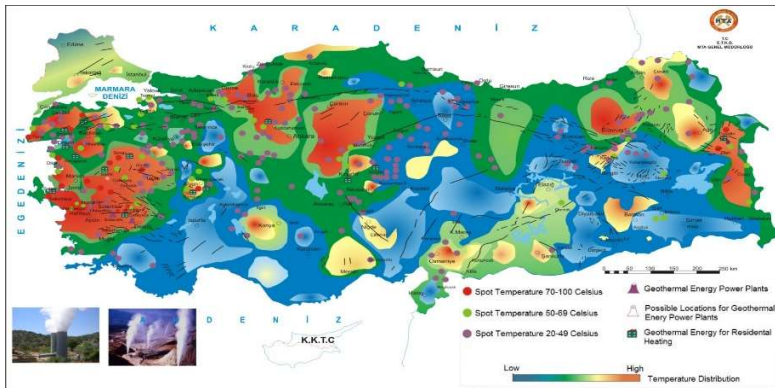
Location	existing DSI project or new project
Electricity sales	FIT prices indexed to FX and Inflation
Application timeline	Apply to YEKDEM in October
Local content	Extra FIT
Installed capacity (as of January-2021)	Dams: 22,934 MW – 133 plants River-run: 8.059,9 MW - 576 plants
Pipeline (as of January-2021)	3,039 MW pre-licensed + 1,770 MW licensed

**TURKEY IS ONE OF THE  
LARGEST GROWING  
HYDRO MARKETS IN 2020  
WITH 2.5 GW NEW  
INSTALLATIONS**

Source: Ministry of Energy of Natural Resources, EMRA

# GEOTHERMAL ENERGY

TURKEY GEOTHERMAL MARKET TO 4 GW BY 2023

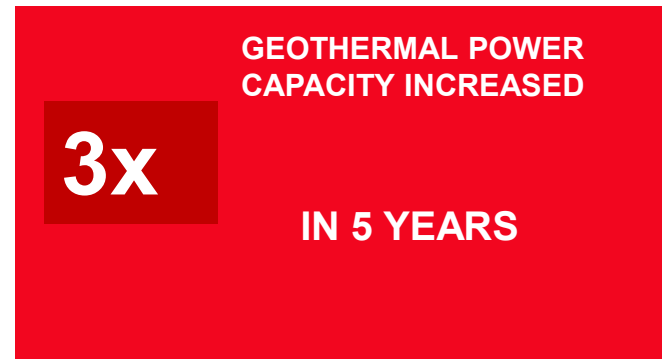


## THE LARGEST GEOTHERMAL POWER MARKET IN EUROPE

2 GW potential in 25 reserves  
**FIT at 54 TRY-cents/kWh for 10 years**  
**+ Local content FIT at 8 TRY-cents/kWh for 5 years**

Location	Based on exploration & production license for the reserve
Auction model	Auctions for reserves are done by MTA or İl Özel İdare
Electricity sales	FIT prices indexed to FX and Inflation
FIT Application timeline	Apply to YEKDEM in October
Local content	Extra FIT
Installed capacity (as of January-2021)	1,624 MW – 60 plants
Pipeline (as of January-2021)	1823 MW licensed + 245 MW pre-licensed

Source: Ministry of Energy and Natural Resources



## YEKA MODEL

## TURKEY'S TRACK RECORD IN YEKA TENDERS



### COMPLETED

#### **PV Tender (March 2017)**

Capacity: 1GW

Power production capacity: circa 1.7 billion kWh

Winning Bid: US\$0.0699/kWh → Hanwha Q Cells–Kalyon

Energy consortium

Expected total investment: \$1.3 billion

60% localization and R&D Investment

#### **Onshore Wind Tender (May 2019)**

Capacity: 1 GW (250 MW for Balıkesir, 250 MW for Çanakkale, 250 MW for Aydın, 250 MW for Muğla)

Starting bid: US\$0.055/kWh

22 Applications Received for the Tender!!!

Winning Bids:

Muğla → US\$ 4 cent/kWh → Enercon

Balıkesir → US\$ 3.53 cent/kWh → Enercon

Aydın → US\$ 4.56 cent/kWh → Enerjisa (Sabancı

Holding and E.ON Partnership)

Çanakkale US\$ 3.67 cent/kWh → Enerjisa (Sabancı

Holding and E.ON Partnership)

PPA Agreement for 15 Years

Expected total investment: 1 billion USD

%55 Localization

#### **Onshore Wind Tender (August 2017)**

Capacity: 1GW

Power production capacity: circa 3 billion kWh

Winning bid: US\$0.0348/kWh → Siemens-Kalyon-Türkerler consortium

Expected total investment: \$1.1 billion

65% localization and R&D Investment

#### **PV Tender (May 2021)**

Capacity: Totally 1 GW with 10-20 MW mini-YEKA solar capacities

74 new plants in 36 separate connection zones

Tender sessions are just completed

Average of Winning Bids: US\$ 0.026/kWh

### ANNOUNCED

#### **Onshore Wind Tender (Q4 2021)**

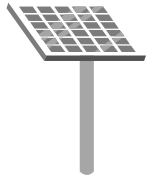
Capacity: 2 GW of Total Capacity  
20-90 MW mini-YEKA capacities

42 separate connection zones

Starting bid: TRY 0.45/kWh

Applications: October 2021





A fast track application process as long as the installed capacity of the generation facility do not exceed the power limit of consumption facility. There is no upper capacity limit.



So long as the generation and consumption facilities are in the same distribution region, they do not need to be established in the same location.



Monthly settlement paves the way for more feasible unlicensed installations.



Possibility to generate electricity from more than one energy source connected to the grid through the same connection point. (Hybrid Facilities Regulation)



The intermittent manner of solar and wind power generation could be eliminated to increase the capacity factor of the facility. This opportunity is an advantage to foster the green hydrogen production facility which should work uninterruptedly.

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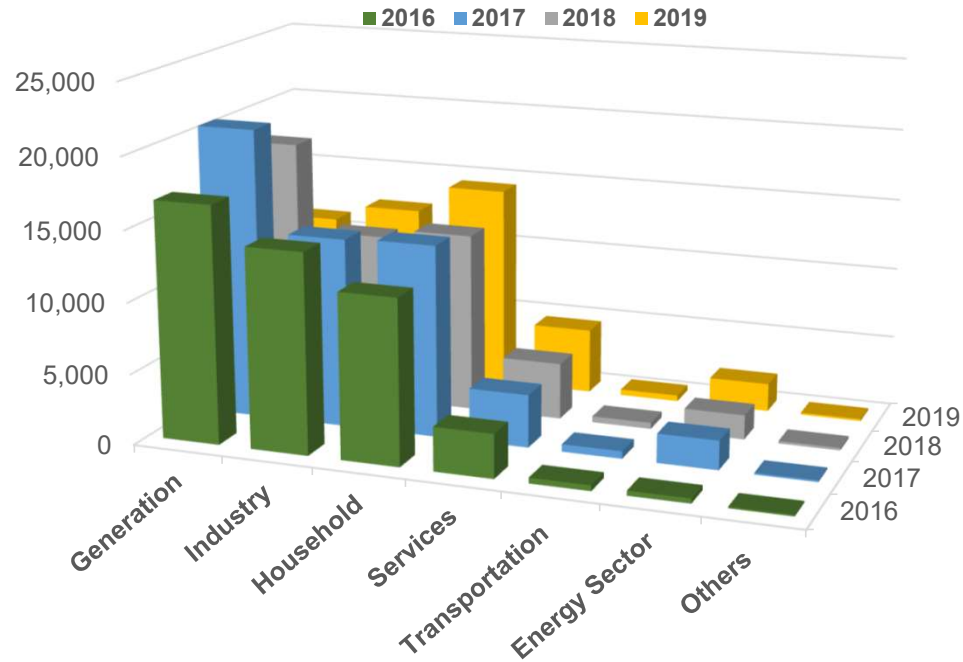
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# NATURAL GAS MARKET OUTLOOK

2020 TOTAL NATURAL GAS CONSUMPTION WAS 49 BCM



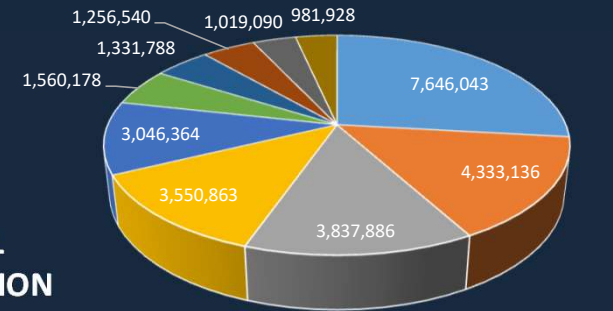
## CONSUMPTION BY SECTORS (MCM)



- Consumption shares of electricity generation, household and industry stand at 24,86%, 31,79% and 27.43% respectively in 2019.
- Amount of natural gas used for electricity generation decreases by 38,11% compared to 2018.

- There exist 72 distribution license holders in the market which in total supply natural gas to 81 provinces.
- Istanbul, Izmir, Ankara are the major provinces in natural gas consumption accounting for about one third of total annual gas consumption of Turkey.

## PROVINCIAL CONSUMPTION (MCM)



İSTANBUL İZMİR ANKARA KOCAELİ BURSA  
KIRIKKALE TEKİRDAĞ BALIKESİR SAMSUN ESKİŞEHİR



## EXISTING PIPELINES



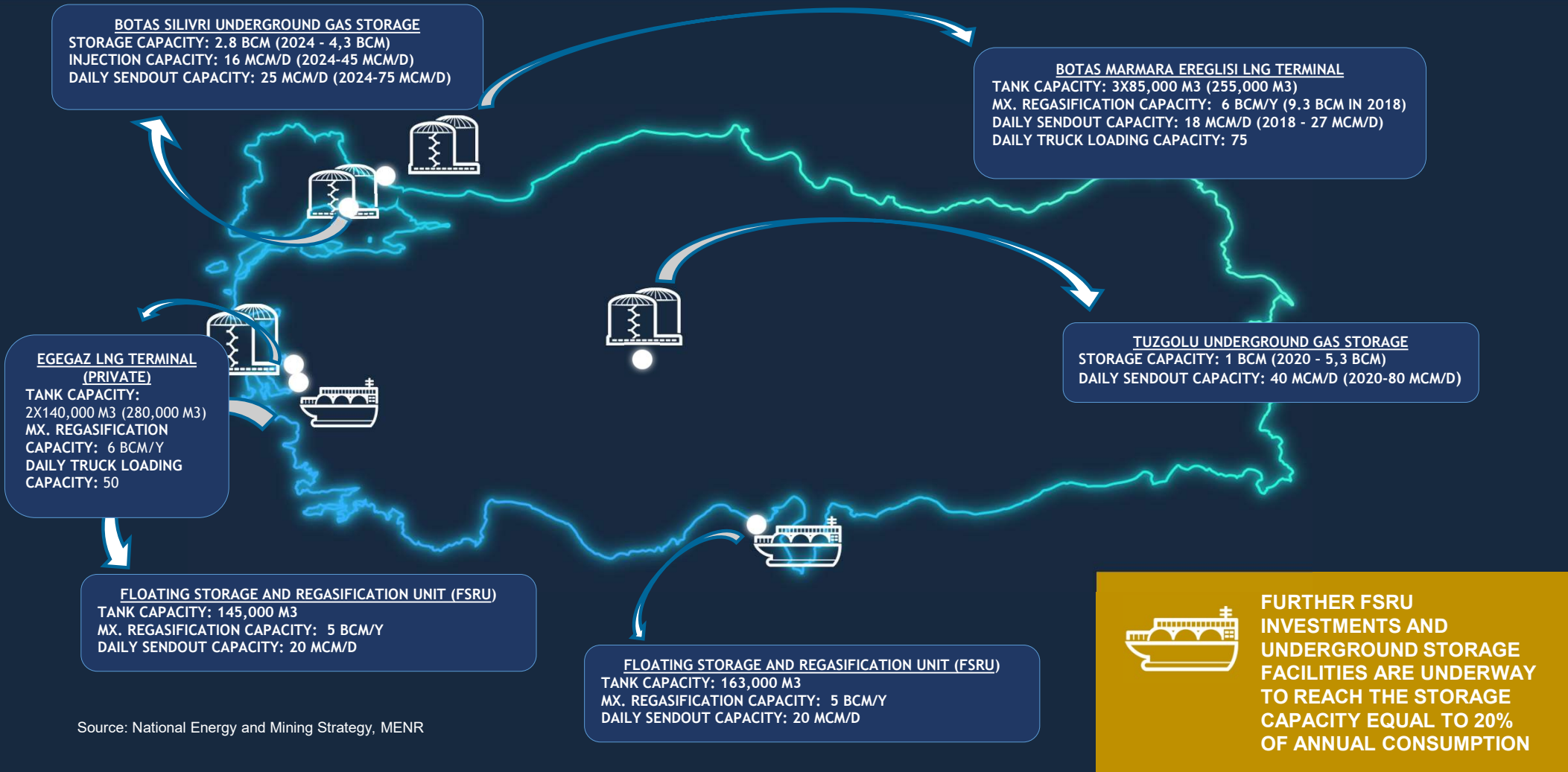
# NATURAL GAS CONTRACTS



		 WEST LINE RUSSIA	 BLUE STREAM RUSSIA	 EASTERN ANATOLIA - IRAN	 SOUTH CAUCASUS - AZERBAIJAN	 LNG - ALGERIA	 LNG - NIGERIA
ACTIVE IMPORT CONTRACTS	 The total length of the pipeline:	842 km	1,213 km	1,491 km	692 km	-	-
	 Contract volume:	14 bcm/a	16 bcm/a	9.6 bcm/a	6.6 bcm/a	4.4 bcm/a	1.3 bcm/a
	 Source country:	Russia	Russia	Iran	Azerbaijan	Algeria	Nigeria
	 Max. daily capacity:	ca. 51.4 mcm/day	ca. 47.4 mcm/day	ca. 28.6 mcm/day	ca. 19.1 mcm/day	-	-
	 Importers:	BOTAŞ (4 bcm/a) and 7 Private(10 bcm/a)	BOTAŞ	BOTAŞ	BOTAŞ	BOTAŞ	BOTAŞ
	 BOTAŞ contract termination date:	End of 2021	End of 2025	July 2026	April 2021	October 2024	October 2021
PROSPECTIVE							
		 TANAP - AZERBAIJAN	 TURKISH STREAM - RUSSIA		 IRAQI GAS		
	 Contract volume:	16 bcm/a (6 bcm/a to Turkey)	 Prospective volume:		 Prospective volume:		
			31.5 bcm/a (15.75 bcm/a to Turkey)		ca. 3 bcm/a		
		 IRAN – TURKEY - EUROPE	 EAST MEDITERRANEAN GAS		 TURKMEN GAS		
	 Prospective volume:	35 bcm/a (Total)	 Prospective volume:		 Contract volume:		
		10-20 bcm/a		16 bcm/a			

Source: Turkish Energy Market Outlook 2016, Deloitte

## LNG & STORAGE



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## HYDROGEN ENERGY



Main focus is green hydrogen.



Hydrogen rises to be a ray of hope to decarbonize the global energy consumption not only in EU, also in the rest of the world, from Canada to Japan, Chile to Australia.



According to EU Hydrogen strategy released in July 2020, €470 Billion of investment to be made in the next thirty years.



2021 will probably be the year of Hydrogen in the EU.

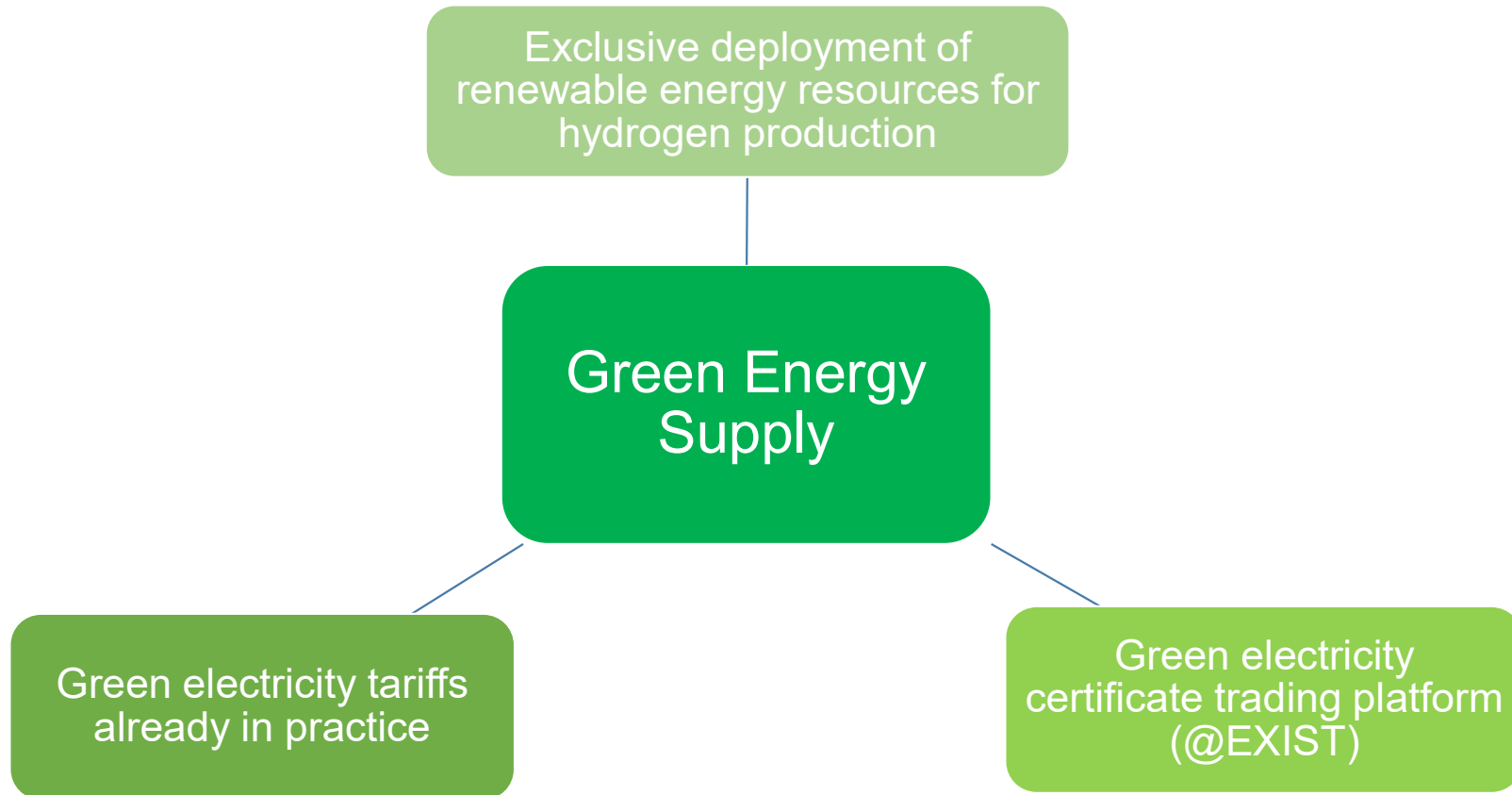


Main hurdle is the lack of efficiency.



## GREEN ENERGY SUPPLY

THREE PILLARS AT TURKEY ENERGY MARKET MECHANISM



## CAPACITY ALLOCATION

INCREASING COMPETITION FOR REACHING  
GREEN ELECTRICITY INSTALLED CAPACITY



AVAILABLE CAPACITY  
For  
HYDROGEN BUSINESS

**Tender-free** and **off-grid**  
unlicensed power plants for  
self-consumption at-site or  
remote

Licensed or unlicensed  
plants exited from 10  
years-long FiT (YEKDEM)  
mechanism

Licensed projects  
Any capacity size



The renewable tariff is available for those who want to use electricity produced only from renewable energy source.



Certificates are issued for homes and businesses using the tariff.



The current costs are high for industrial users, but they're expected to go downward in the medium to long run with the reduction of the green electricity generation costs.

## YEK-G TRADING PLATFORM

WILL BE OPERATIONAL by JUNE 2021



YEK-G documentation will be produced and registered for green electricity producers for a newly formed market on Energy Exchange Istanbul (EXIST) where the cost of renewable electricity will be traded.



The regulations will allow consumers to choose the source of the electricity they use.



Every megawatt-hour of produced electricity will be documented in the system to allow for complete transparency for consumers.



The system will also be aligned with the European Union's Guarantees of Origin, which are market-based instruments that offer an effective way to increase the market momentum for renewable energy.



- The EU aims to be climate neutral in 2050. Reaching this target will require actions by all sectors.
- It is crystal clear that the EU will be a net green hydrogen importer.
- Carbon border adjustment on carbon foot-printed goods.
- Almost half of Turkey's exports are flowing into Eurozone and European markets.
- EU Acquis harmonization due to EU candidanship status and Customs Union Agreement.

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## SUCCESS STORIES

STRONG INTERNATIONAL PRESENCE IN TURKEY





PRESIDENCY OF  
THE REPUBLIC OF TÜRKİYE  
**INVESTMENT  
OFFICE**



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