

Turkish Energy Market in Transition

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**1ST GREEK-TURKISH
ENERGY FORUM**

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Turkish Economy - 2023



- ▶ Population: ~85 Million
- ▶ GDP: 1,118.6 Bn USD
- ▶ GDP growth: 4.5%
- ▶ Gross External Debt Stock to GDP as of 31 Dec: 44.7%
- ▶ Tourism revenues: 54.3 Bn USD
- ▶ Consumer price index: 64.8%
- ▶ Trade volume: 617.6 Bn USD
- ▶ Top export markets: Germany, USA, Iraq, UK, Italy
- ▶ Top import markets: RF, China, Germany, Switzerland, USA
- ▶ 6th largest economy in Europe, 17th largest in the world

Strengths and Vulnerabilities of Turkish Economy

Attractive production base – heavily dependent on import of energy, raw materials and semi-finished goods

Sector	# Europe	# World
Agricultural products	1st	10th
White appliances	1st	2nd
Cement	1st	5th
Footwear	1st	11th
Iron & steel	1st	7th
Photo-voltaic panels	1st	4th
Plastics	2nd	7th
Motor vehicles	4th	15th
Electricity generation	4th	15th
Merchant fleet	4th	12th
Air travel	3rd	7th

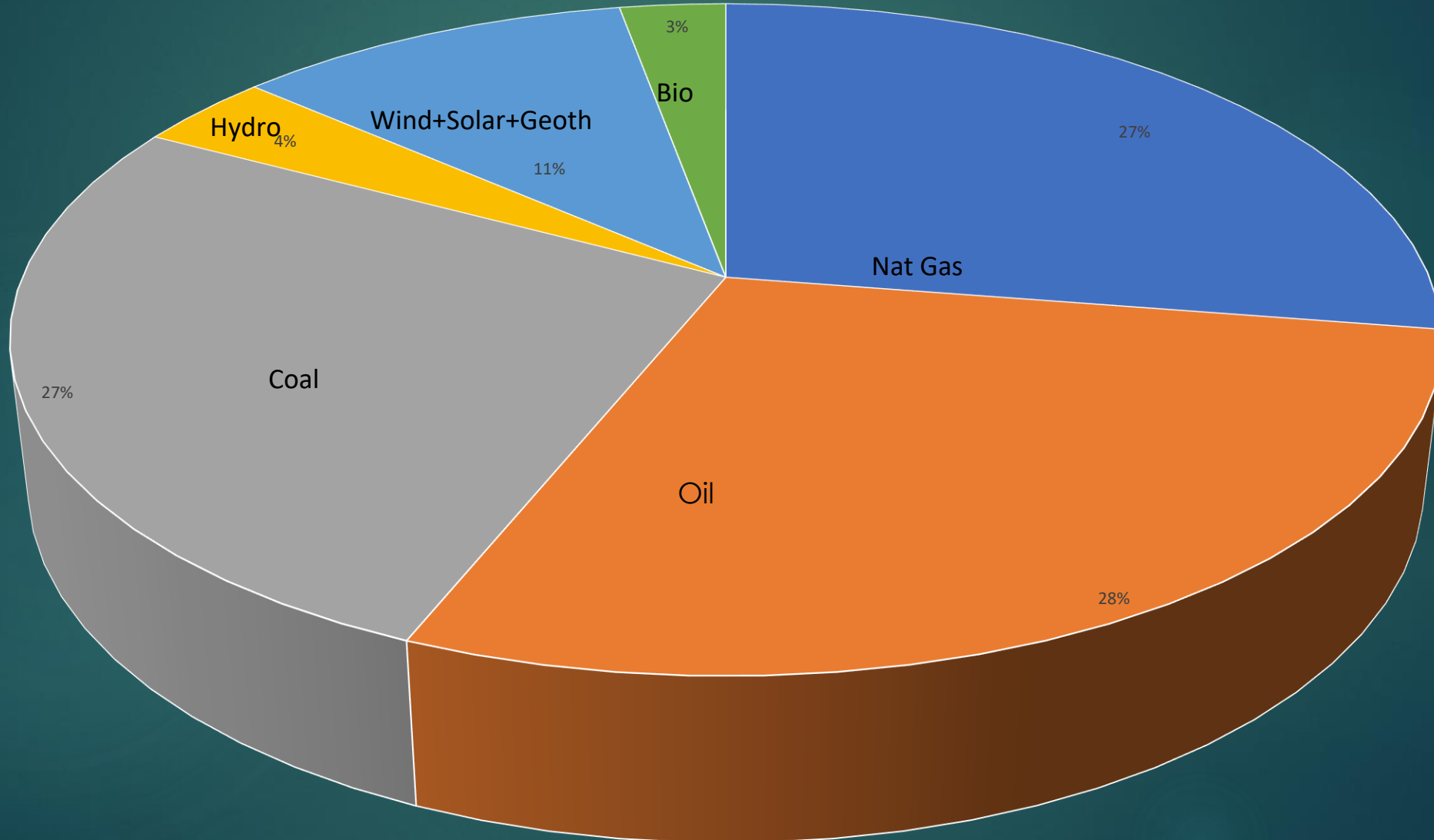
National Energy Plan 2020-2035

To achieve Türkiye's **2053 Net Zero Emission Target**, main objective of Turkish energy policy is to provide the highest contribution to national welfare by supplying uninterrupted, sustainable, high quality, reliable and cost-effective energy from diversified sources in most efficient and environmentally conscious manner.

- ▶ Maximum utilization of renewable energy sources,
- ▶ Introduction of nuclear energy into the energy mix,
- ▶ Use of natural gas as a transition fuel,
- ▶ Exploration and utilization of new hydrocarbon resources,
- ▶ Strengthening the energy infrastructure in line with the energy transition,
- ▶ Investment in hydrogen, critical minerals, storage and digitalization,
- ▶ Further development of local equipment production for the energy sector,
- ▶ Creating a competitive energy market,
- ▶ Strengthening the role of Türkiye in international energy trade.

Primary Energy Mix of Türkiye 2022

157.7 Mill toe Share of imports: 67.8% - Share of fossil fuels: 82.7%



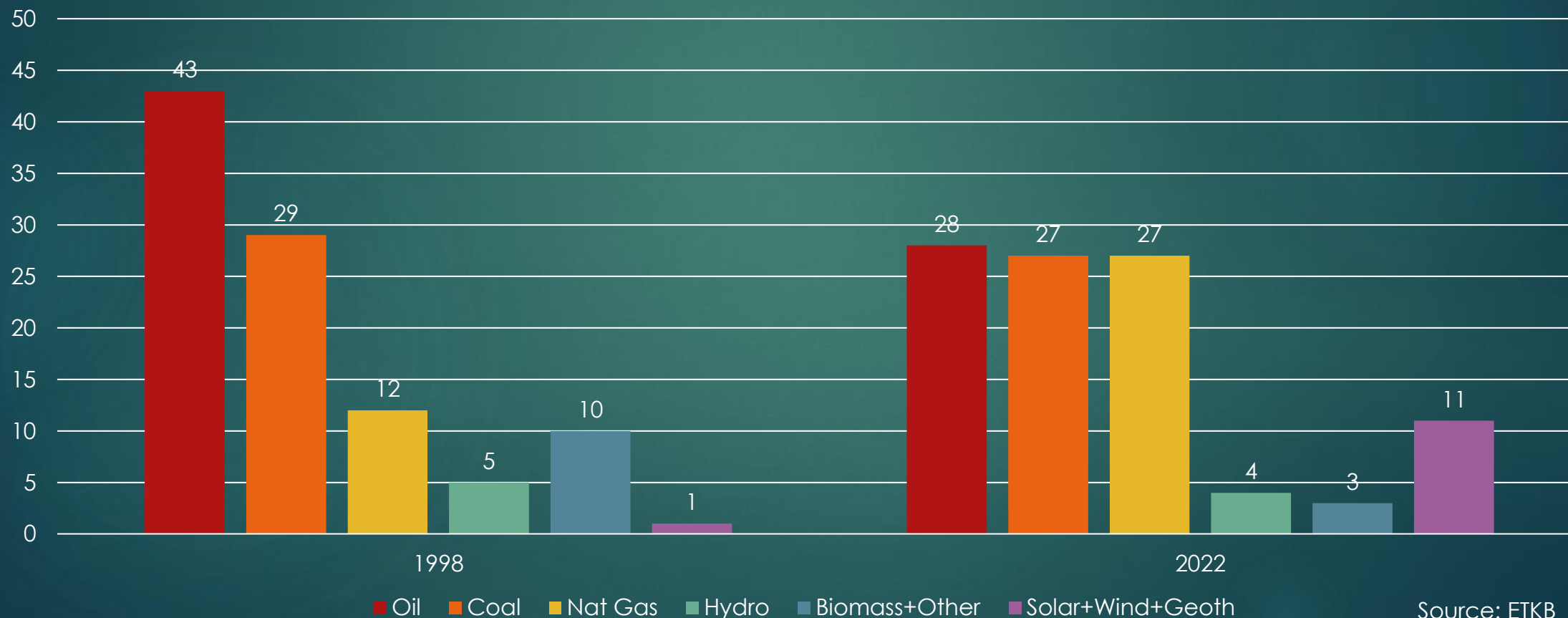
Primary Energy Mix of Turkey

1998: 73.3 Mill toe

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2022: 157,7 Mill toe

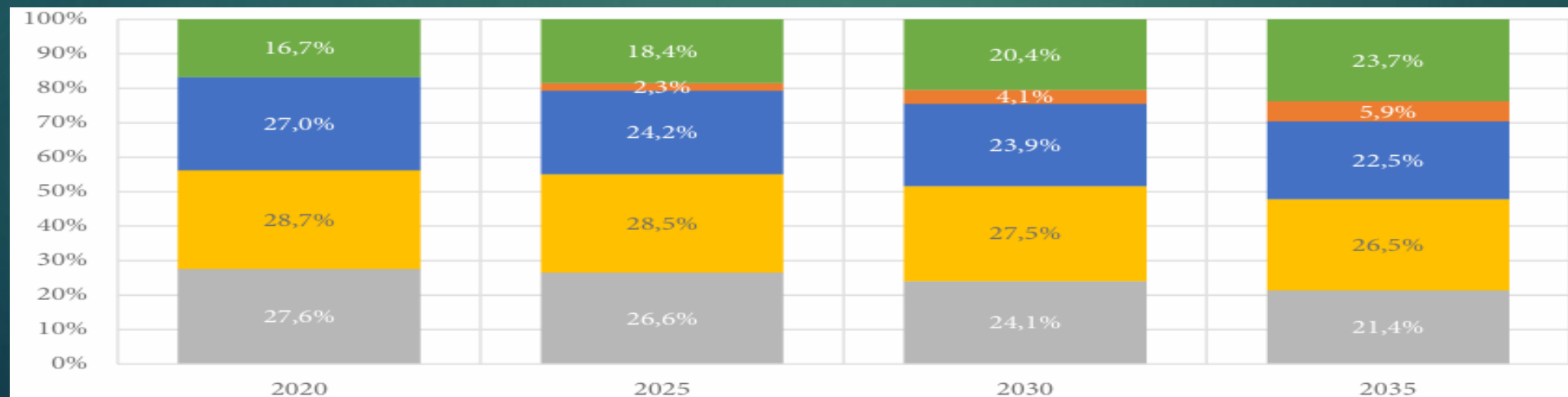
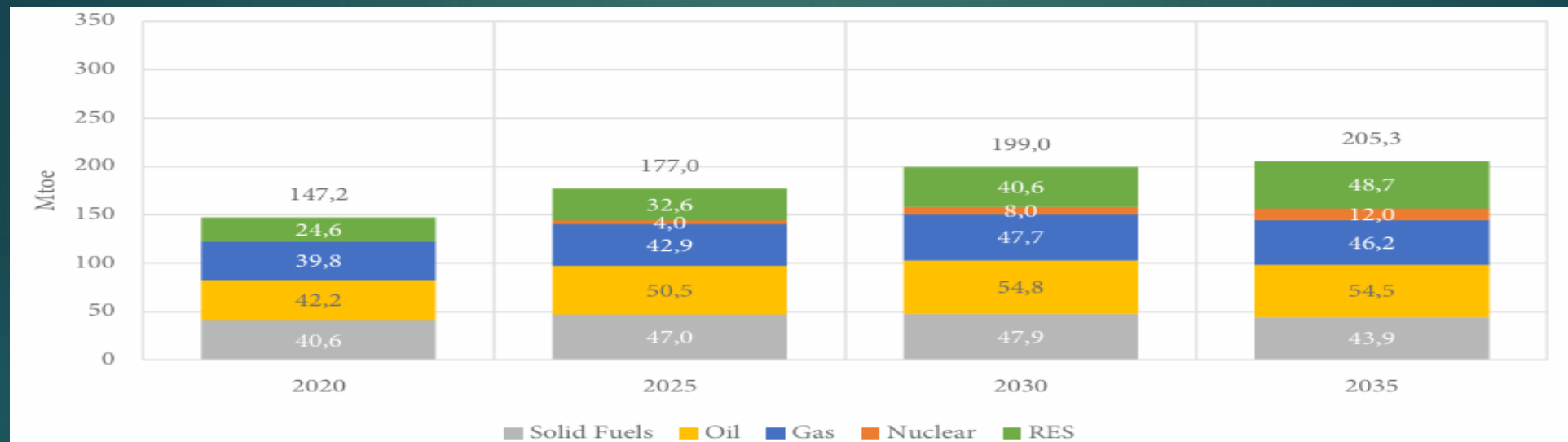
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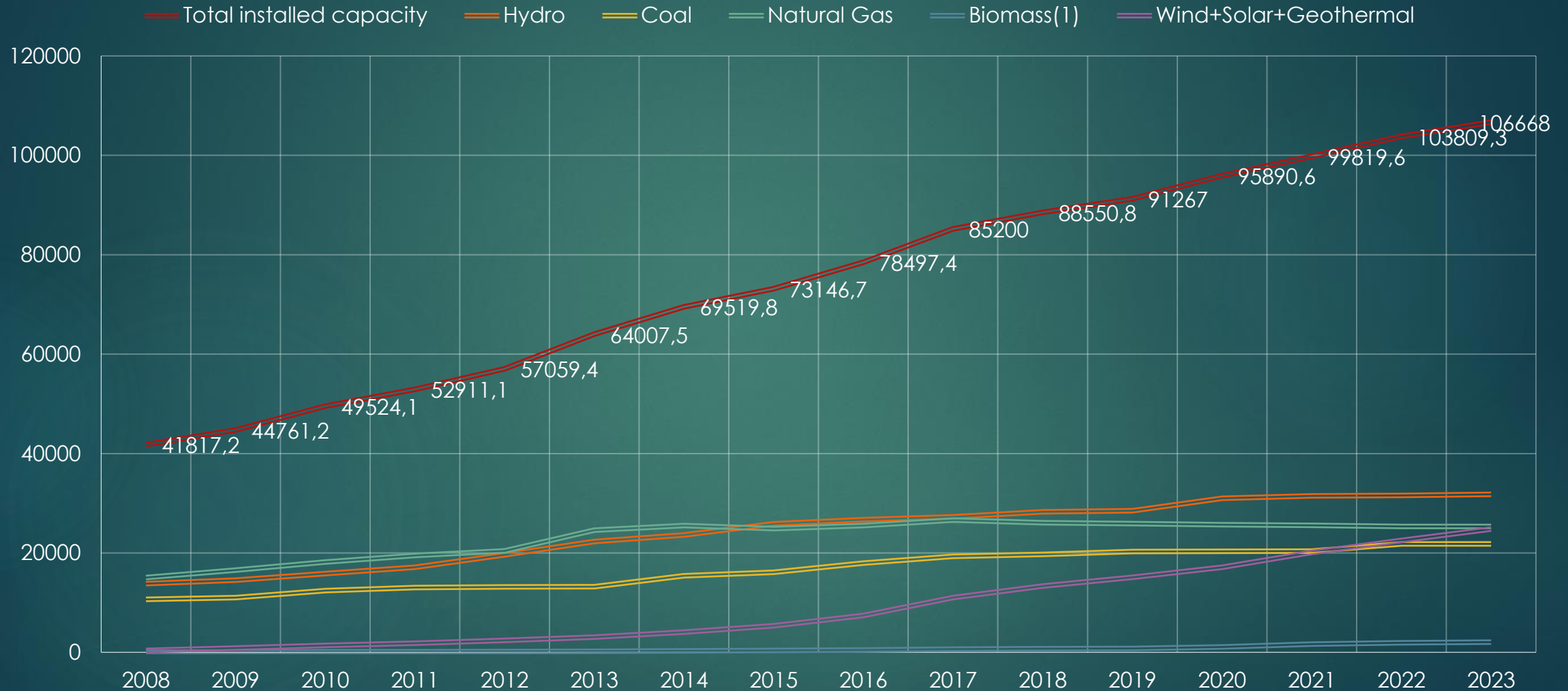
Source: ETKB

National Energy Plan 2020-2035

Primary Energy Consumption and its Distribution by Source



Development of installed capacity



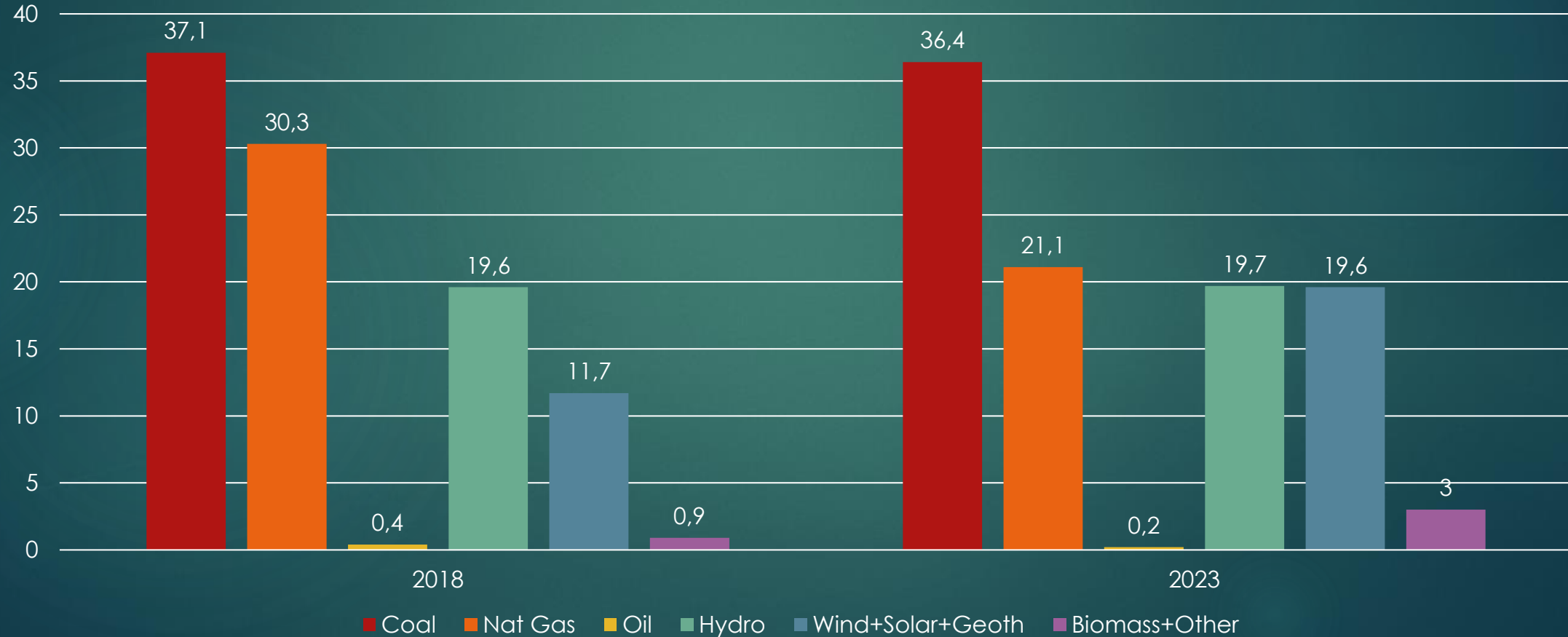
ELECTRICITY GENERATION BY SOURCE

%

Source: TEİAŞ, Ministry of Energy and Natural Resources

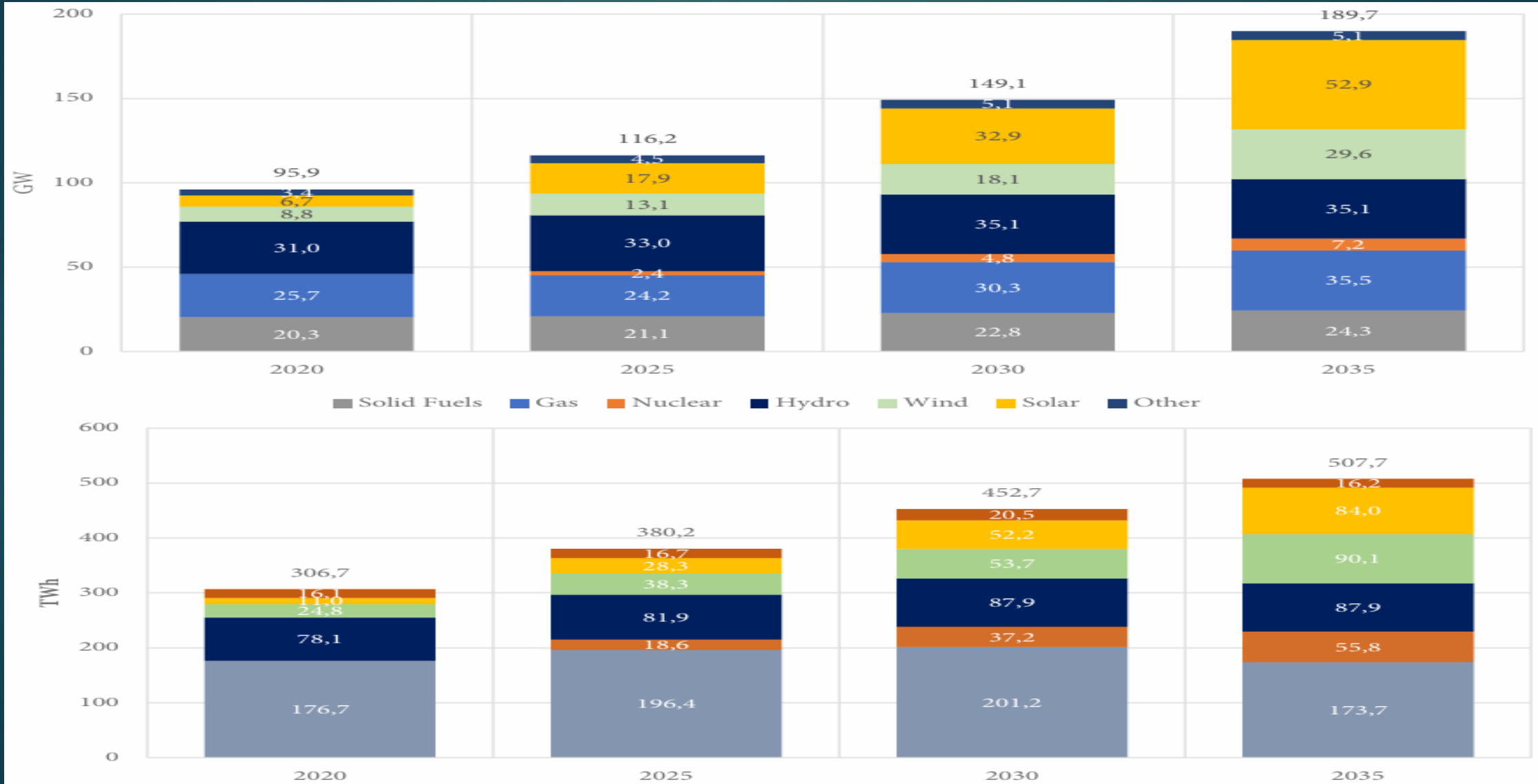
2018
275.1 GWh

2023
334.8 GWh

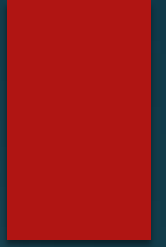


National Energy Plan 2020-2035

Installed Capacity and Electricity Generation by Source



How to Promote Electricity Generation from Renewables?



► Turkish Feed-in Tariff System YEKDEM + Local Component Bonus

- Yearly application of the generator to be included into the YEKDEM system
- YEKDEM supports are applicable for 10 years
- Local Component Bonus determines the additional incentives according the percentage of domestically manufactured components in the equipment

► Turkish auctions model YEKA

- YEKA model requires the successful bidders of the auctions to use locally manufactured equipment
- The bidder offering the lowest electricity purchase price is the winner of the auction
- Electricity purchase is guaranteed for 15 years after the signing of the contract
- First round of auctions allocated 1,000 MW installed capacity to one generator with the condition of investment in equipment production and research & development

NEW YEKDEM FEED-IN TARIFF

Renewable Energy Source		YEKDEM Feed-in Tariff system				Local Component Support	
		Tariff TL Kuruş/kWh	Support Period Years	Base US cents/kWh	Ceiling US cents/kWh	Tariff TL Kuruş/kWh	Support Period Years
Hydro	Reservoir	144.00	10	6.75	8.25	28.80	5
	Run-of-river	135.00	10	6.30	7.70	28.80	5
Wind	Onshore	106.00	10	4.95	6.05	28.80	5
	Offshore	144.00	10	6.75	8.25	38.45	5
Geothermal		202.00	15	9.45	11.55	28.80	5
Biomass	Waste gas (*)	106.00	10	4.95	6.05	28.80	5
	Biomethanization	173.00	10	8.10	9.90	28.80	5
	Combustion (**)	134.90	10	5.75	8.00	21.58	5
Solar		106.00	10	4.95	6.05	28.80	5
Wind/Solar + Storage		125.00	10	5.85	7.15	38.45	10
Pumped Storage		202.00	15	9.45	11.55	38.45	10
Wave or current		135.00	10	6.30	7.70	38.45	10

Source: Official Gazette Nr. 32177 from 1 May 2023. (*) Generation from landfill gas and waste tires, (**) Municipal waste, Oil seeds waste, Agricultural waste, Forest products waste, Industrial waste sludge and sewage sludge.

Nuclear is Part of the Energy Transition

Akkuyu Nuclear Power Plant Mersin Province

Reactor design: NPP 2006 (WER-1200), 4 x 1200 MW

Construction period: 2018-2028

12 May 2010: IGA has been signed

IGA has been ratified in both parliaments

12 Dec 2013: Updated site report approved

01 Jan 2014: Environmental impact assesment approved

25 Jun 2015: Preliminary Generation license issued

09 Feb 2017: Design parameters approved

03 Apr 2018: Ground breaking ceremony of the first unit

23 Apr 2023: Fresh nuclear fuel for Unit 1 delivered

11 Apr 2024: Commissioning stage of the first unit started

Other Projects

Sinop NPP Inceburun, Sinop Province,

İğneada NPP, Kırklareli Province,

Ongoing negotiations with RF, China, S. Korea

Small Modular Reactor Project

Talks with UK, USA, France



Source: Akkuyu Nükleer A.Ş.

ENERGY EFFICIENCY MILESTONES

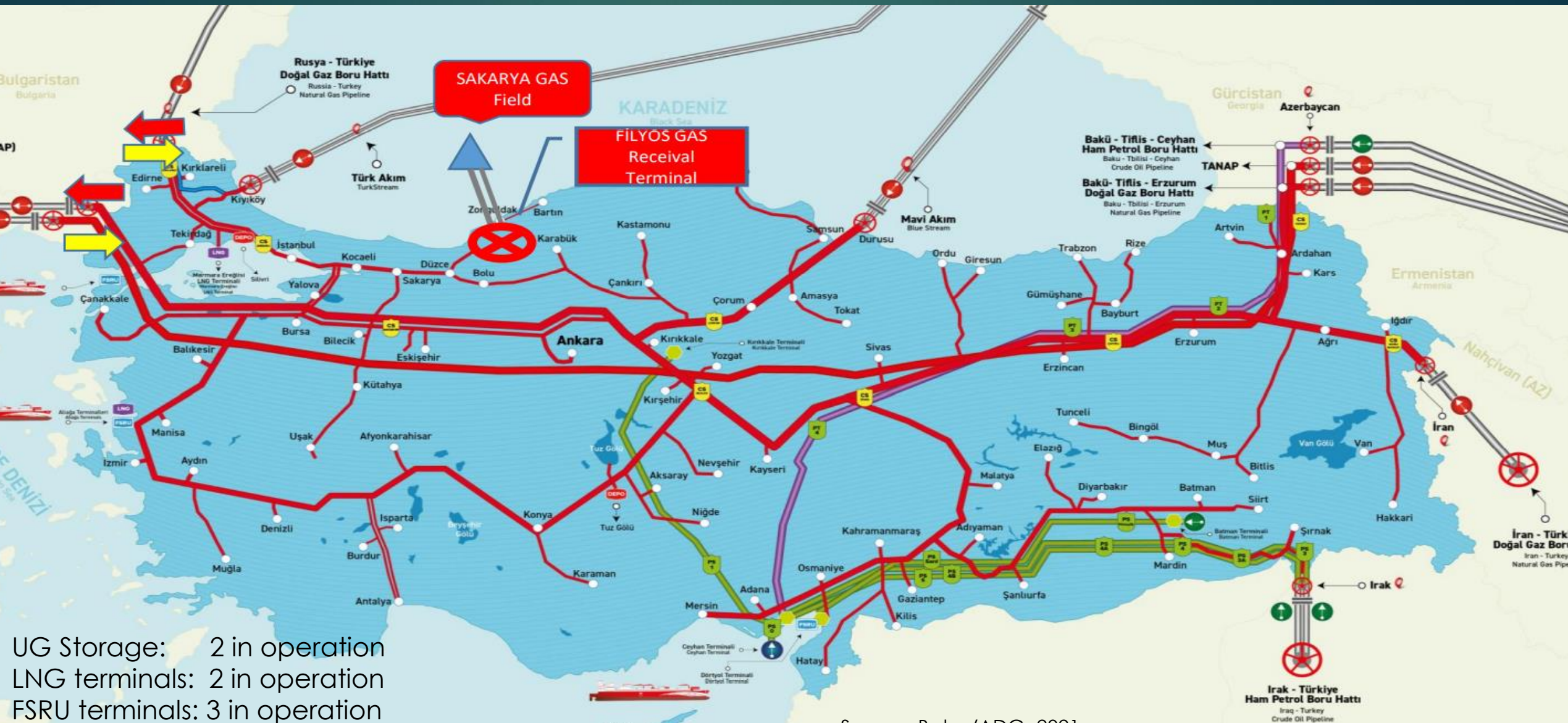
The first ever regulation for energy efficiency, 1977,
Thermal Insulation Rules in Buildings Standard TS 825 from 2000 (revised in 2008),
The Energy Efficiency Law No. 5627 adopted in 2007,
Energy Efficiency Strategy 2012-2023, National Energy Efficiency Action Plan 2017-2023,
The Energy Efficiency 2030 Strategy and II. National Energy Efficiency Action Plan, 2024,
Cumulative savings: 37.1 mtoe, Emission reduction: 100 mt, Energy intensity reduction: 15%



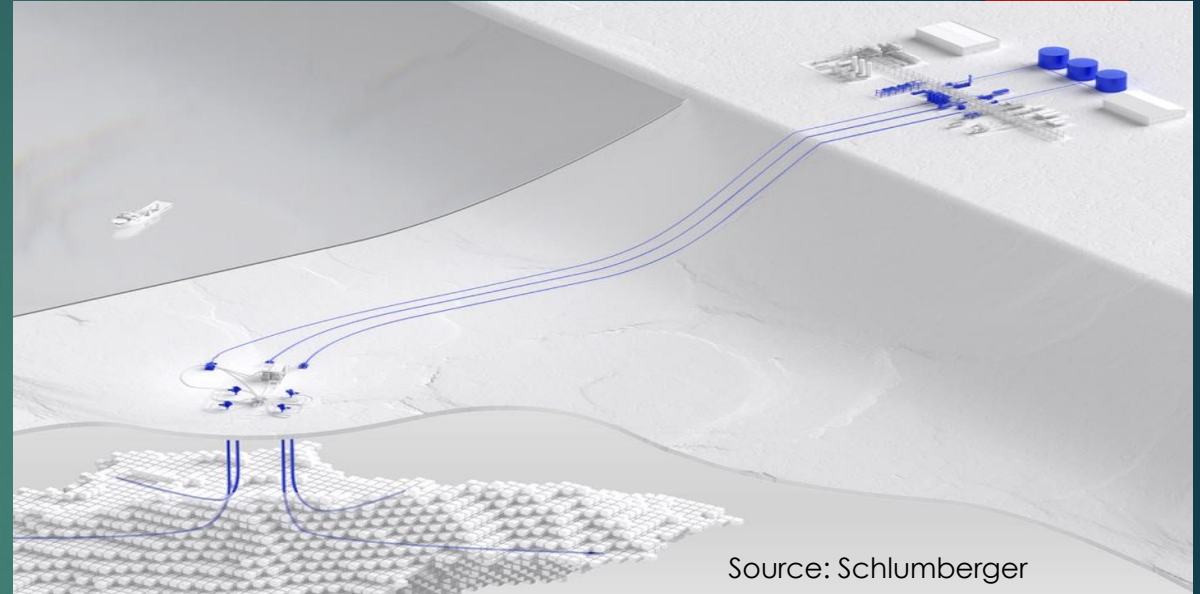
	2024	2025	2026	2027	2028	2029	2030
Savings (mtoe)	1.197	1.120	1.266	1.403	1.589	1.703	1.884
Investments (USD)	2.452	2.656	2.544	2.513	3.086	3.227	3.574

Natural Gas as Transition Fuel

2023 Demand: ~ 50 bcm



SAKARYA OFF-SHORE NATURAL GAS BASIN



- Aug 2020: Tuna-1 well intercepted a 320 bcm natural gas-bearing reservoir of more than 100 m,
 - Oct 2020: Discovery of 30 m gas-bearing reservoir with 85 bcm in the lower sections of Tuna-1 well,
 - Jun 2021 : Amasra-1 well in northern part of Sakarya Basin discovers 135 bcm gas,
 - Oct 2021: EPCI contract for the Phase I development to produce 10 mcm/d awarded,
 - Dec 2022: Discovered reserve was revised up to 652 bcm regarding the appraisal work,
 - Dec 2022: Çaycuma-1 well discovered 58 bcm gas in the northwest part of the basin,
 - May 2023: Phase I trial production started,
 - May 2023: EPCI contract for the Phase II development was awarded,
 - Mar 2024: Phase I production reached 3.7 mcm/d.
- TPAO plans to increase the production to 40 mcm/d until end of this decade.

ENERGY TRANSITION IN TRANSPORT

RAILWAY TRANSPORT TÜRKİYE		
Year	Freight (Mill. t)	Passenger (Mill.)*
2003	15.9	76.9
2014	28.7	153.6
2022	38.5	318.1

Source: TCCD Sector Report, 2022

* Including suburban trains

MODAL SPLIT 2020 (%)				
	Freight		Passenger	
	Railway	Road	Railway	Road
Turkey	4.5	79.7	2.7	97.3
Germany	17.1	73.0	6.4	93.6

Source: EU Transport, Statistical Pocketbook, 2022

Air and Maritime transportation are excluded.

ENERGY TRANSITION IN TRANSPORT – HIGH SPEED RAILWAYS

2009: 397 km
2010: 888 km
2017: 1,213 km
2021: 1,432 km
2023: 2,250 km

Construction: 1,376 km

Share of Railway in Passenger Transport
between Ankara and Eskişehir
Before High Speed Train: 8%
High Speed Train Service: 72%



ELECTROMOBILITY

- Ford Otosan rolled out all-electric commercial vehicles in April 2022,
- Indigenous Turkish electric car TOGG deliveries started in April 2023,
- Turkish e-bus manufacturers Karsan, Temsa, Otokar and Anadolu Isuzu export to European markets,
- 6th place in EV sales in Europe.

Years	Electric	Hybrid	Total
2015	119	106	225
2016	44	950	994
2017	77	4,451	4,528
2018	155	3,876	4,031
2019	222	11,015	11,237
2020	844	16,941	10,049
2021	2,846	20,915	23,764
2022	8,210	19,126	35,906
2023	65,604*	35,906	101,510

EV reached 7% market share

Leading EV model sales

1.TOGG T10X: 19,583

2.Tesla Model Y: 12,150

(Source: TEHAD)

- *72.179 with Extended range EV
- Excluding direct imports of individuals

ELECTROMOBILITY – CHARGING STATIONS

Charging Stations: 5,614
AC Charger: 8,492
DC Charger: 3,575

Source: Energy Market Regulatory Authority, as of Dec 2023



Source: wrightcoating.com

ENERGY TRANSITION WITHOUT FUNCTIONING MARKET?

EXIST Energy Exchange Istanbul

Established in March 2015, fourth largest Energy Exchange in Europe

Electricity market operations:

- Day ahead market,
- Intra-day market,
- Balancing market,
- Market registration process,
- Market Settlement
- Power Futures Market transactions started, 1 June 2021
- Organized Renewable Energy Certificates YEK-G Market, 1 June 2021

Natural gas market:

- 1 Sept 2018: Organized Natural Gas Market has started
- 1 June 2020: Natural Gas Market Weekly Products launched
- 1 Oct 2021: Natural Gas Futures Market launched, monthly, quarterly and yearly contracts

IS TURKEY READY FOR ENERGY TRANSITION?

Renewables: Good track record but Investments need to be accelerated

Energy Efficiency: More Investments needed

Electricity Market: Abolish tariffs, more market transparency needed

Natural gas Infrastructure: More underground storage capacity needed

Natural Gas Market: Still a long way to “Gas to gas competition”

Transport Sector: Needs a special focus

In conclusion: A lot is done but still a long way to go.



Thank you

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