



Turkey - Energy Transition despite Pandemic?

DR. H. YURDAKUL YIGITGUDEN

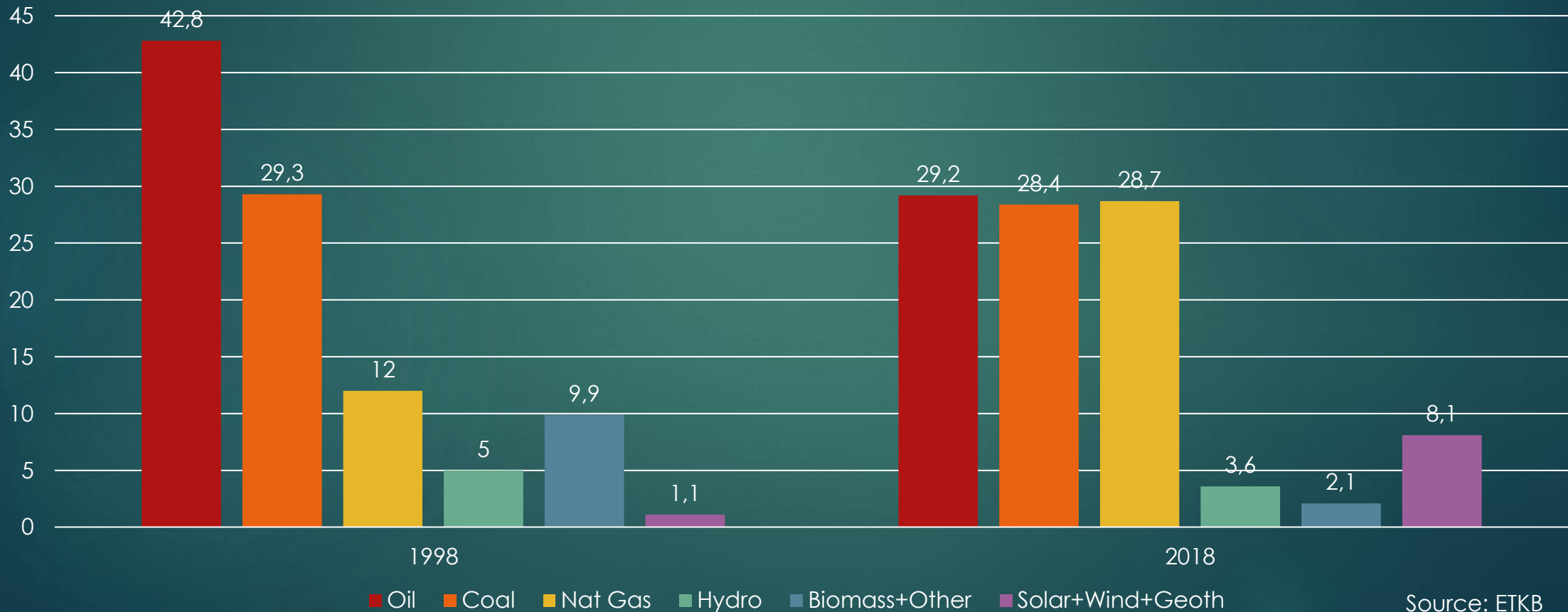
**CONSULTANT, FORMER CO-ORDINATOR OF OSCE ECONOMIC AND
ENVIRONMENTAL ACTIVITIES**

**IENE 12TH SE EUROPE ENERGY DIALOGUE-VIRTUAL
“IN SEARCH OF A NEW ENERGY DIRECTION”
ATHENS, DECEMBER 9-10, 2020**

Primary Energy Mix of Turkey

1998:73.3 Mill TOE - 2018: 143.666 Mill TOE

%

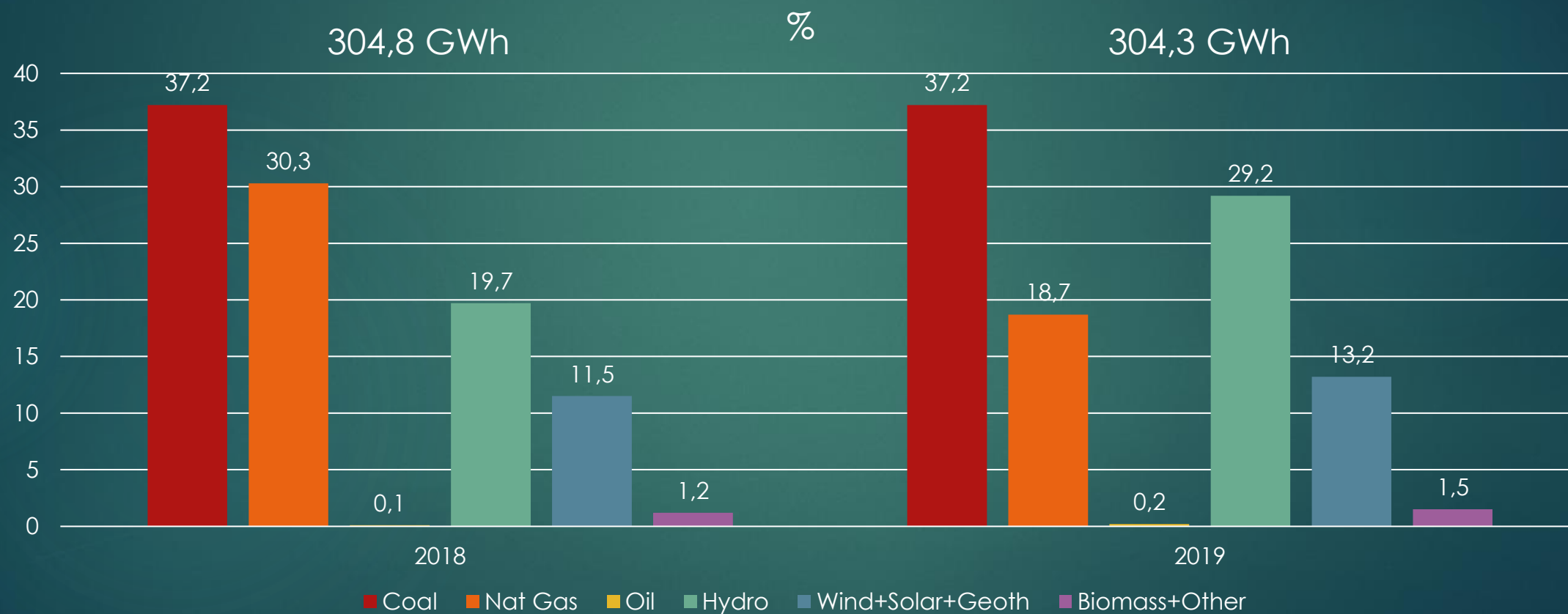


Source: ETKB

ENERGY TRANSITION-ELECTRICITY GENERATION

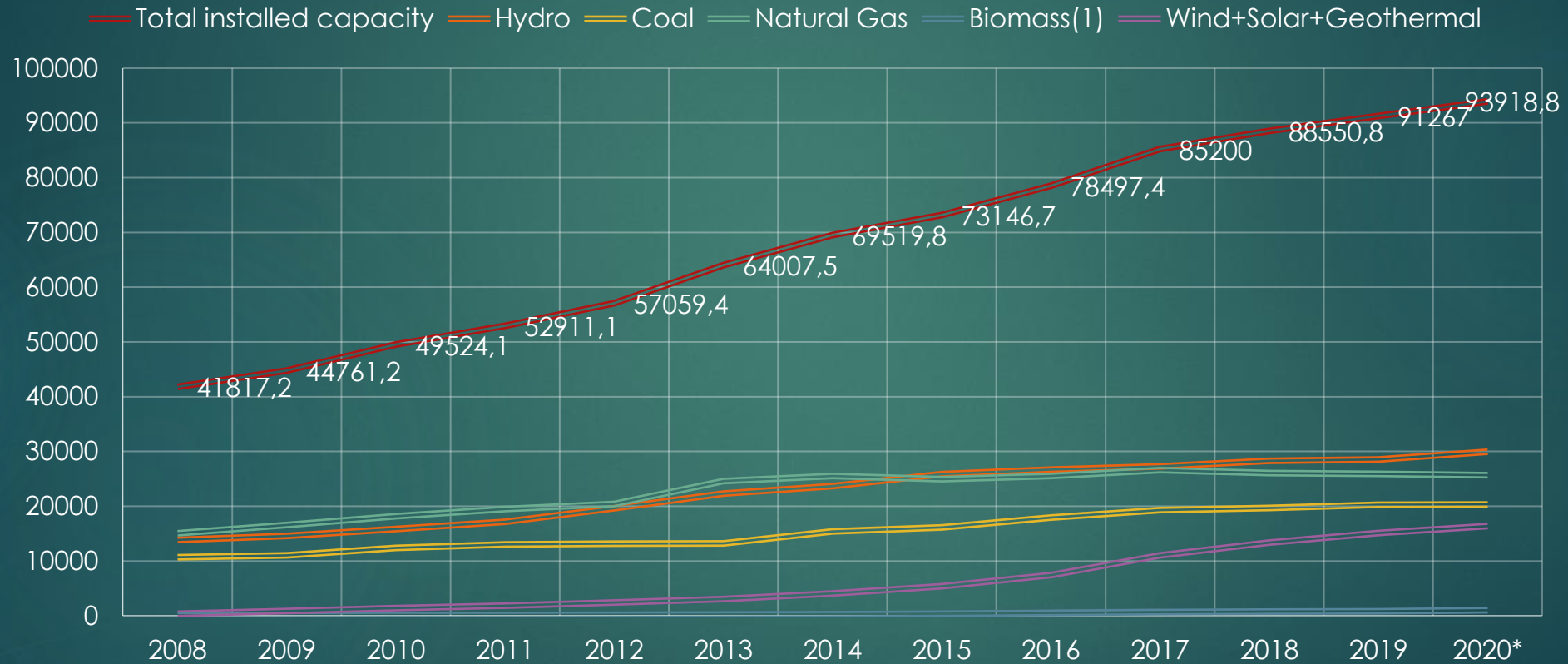
(2020 Jan-Sep: 34% Coal, 19% NatGas, 46% Renewables)

Source: TEİAŞ



Development of installed capacity

INSTALLED CAPACITY

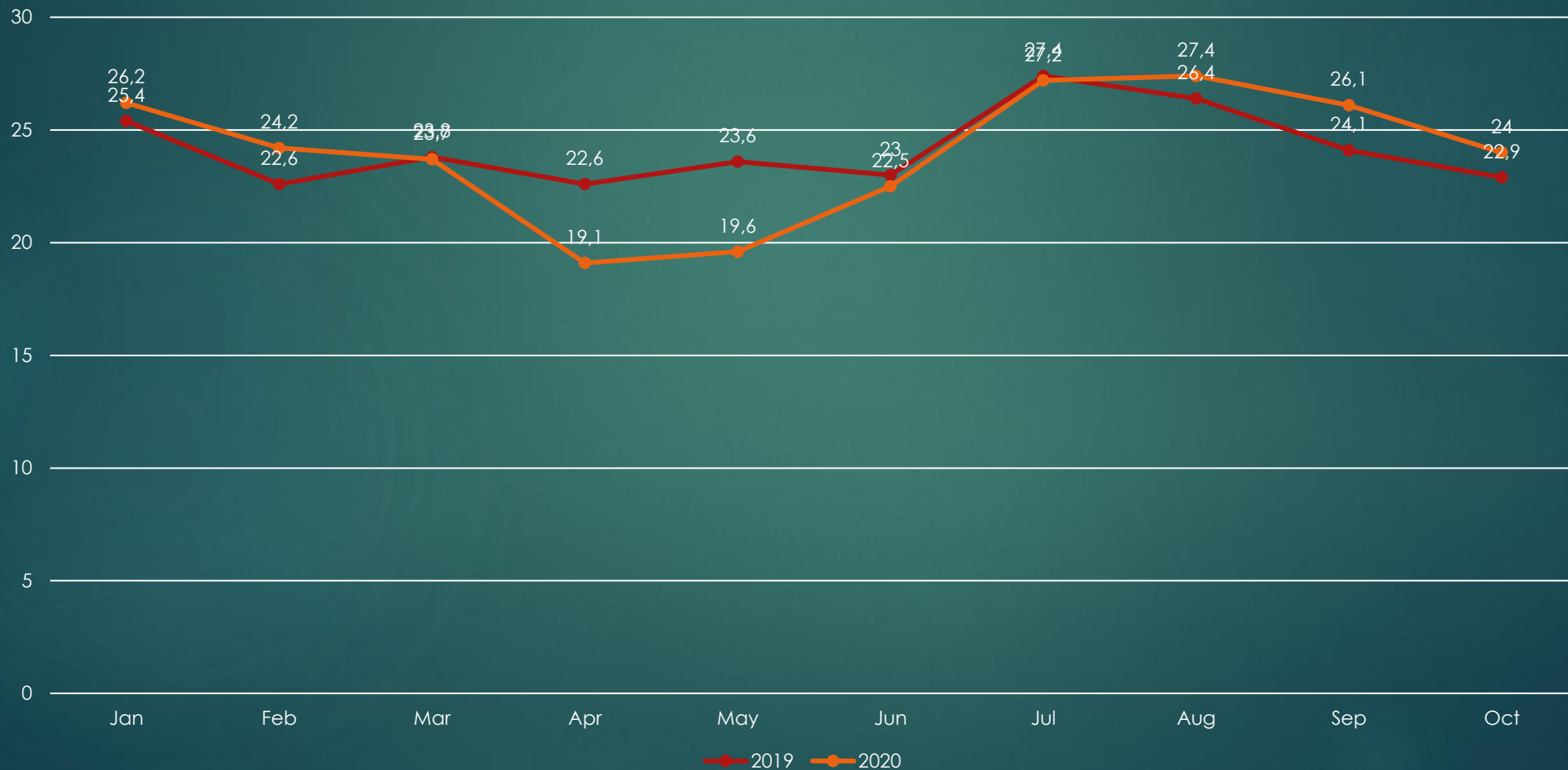


* January-October, Source: TEİAŞ

Electricity Demand in Pandemic Era

Electricity Demand Jan-Oct, 2019-2020

(TWh, Source: TEİAŞ)



RENEWABLES NEWS OF PANDEMIC ERA

- Successor of YEKDEM for the next ten years under preparation
- Regulation on the grid connection of energy storage systems published in Feb 2020
- Regulation on hybrid electricity generation published in March 2020
- Green electricity tariff introduced in August 2020
- Turkey's first integrated PV factory with 500 MW/a capacity inaugurated in Aug 2020
- 1 GW Solar "Renewable resource areas" YEKA auction winner commissioned first 4 MW in Sep
- Second 1000 MW PV YEKA auction for 10 to 20 MW in 74 locations postponed to Jan 18-22, 2021
- Feed-in tariff system YEKDEM extended until July 30 2021

RENEWABLES: Hydro

Source:ETKB, EPDK

2023 Target: Full utilization of 140 TWh/a potential ~40.000 MW(2010 36% in operation)
Strategic Plan 2019 target: 32.000 MW

2000: 11.175 MW

2005: 12.906 MW

2010: 15.831 MW

2011: 17.137 MW

2012: 19.609 MW

2013: 22.289 MW

2014: 23.643 MW

2015: 25.868 MW

2016: 26.681 MW

2017: 27.273 MW

2018: 28.291 MW

2019: 28.503 MW

2020: 29.919 MW (as of October 31)



Renewables: Wind

2023 target: 20.000 MW, Strategic Plan 2019 target: 10.000 MW



2007: 27 MW
2008: 433 MW
2009: 800 MW

2010: 1.329 MW
2011: 1.729 MW
2012: 2.261 MW
2013: 2.760 MW
2014: 3.630 MW
2015: 4.365 MW
2016: 5.751 MW
2017: 6.516 MW
2018: 7.005 MW
2019: 7.591 MW
2020: 8.330 MW
(as of Oct 31))

- August 2017 1000 MW tender: 3,48 \$cent/kWh
- May 2019 4 x 250 MW tender: 3,53 / 3,69 / 4,00 / 4,56 \$cent/kWh

Renewables: Geothermal

2023 Target: 600 Mwe, Strategic Plan 2019 Target: 1.300 Mwe

Source:EPDK

2002: 15 MWe

2012: 162,2 MWe

2013: 310,8 MWe

2014: 404.9 MWe

2015: 623,9 MWe

2016: 820,9 MWe

2017: 1063,7 MWe

2018: 1282,5 MWe

2019: 1514,7 Mwe

2020: 1579,2 Mwe

(as of October 31)



Renewables: Solar

2023 Target: n/a, Strategic Plan 2019 Target: 3000 MW

2014: 40,2 MW
2015: 248,8 MW
2016: 832,5 MW
2017: 3.420,7 MW
2018: 4.662,9 MW
2019: 5.995.2 MW
2020: 6.454.4 MW
(as of Oct 31)



- Auction March 2017 1000 MW: 69,9 \$/MWh
- New tenders for 74 locations postponed

Renewables: Biomass

2023 Target: n/a, Strategic Plan 2019 Target: 700 MW

2007: 43 MW
2008: 60 MW
2009: 87 MW
2010: 107 MW
2011: 126 MW
2012: 169 MW
2013: 235 MW
2014: 299 MW
2015: 370 MW
2016: 496 MW
2017: 642 MW
2018: 739 MW
2019: 802 MW
2020: 1022 MW
(as of Oct 31)



Nuclear News of Pandemic Era

Source: Akkuyu Nükleer A.Ş. MENR

Akkuyu Nuclear Power Plant: NPP 2006 (3+ VVER-1200), 4 x 1200 MW

Apr 3, 2018: Ground-breaking ceremony of UNIT 1

Mar 8, 2019: Concrete pouring of the foundation slabs of UNIT 1 completed

Jul 29, 2019: Core Melt Localization Device (Core catcher) of UNIT 1 delivered to construction site

Recent Progress in 2020:

Apr 8 : Ground-breaking ceremony of UNIT 2

Jul 1 : Second tier of the reactor building's internal containment completed at the UNIT 1

Aug 8: Core catcher of UNIT 2 has been delivered to Akkuyu NPP construction site

Sep 9 : The reactor pressure vessel dry shielding installed at UNIT 1

Sep 22: Concrete pouring of the reactor and turbine buildings foundation slabs at UNIT 2 completed

Oct 10: Four steam generators for UNIT 1 delivered

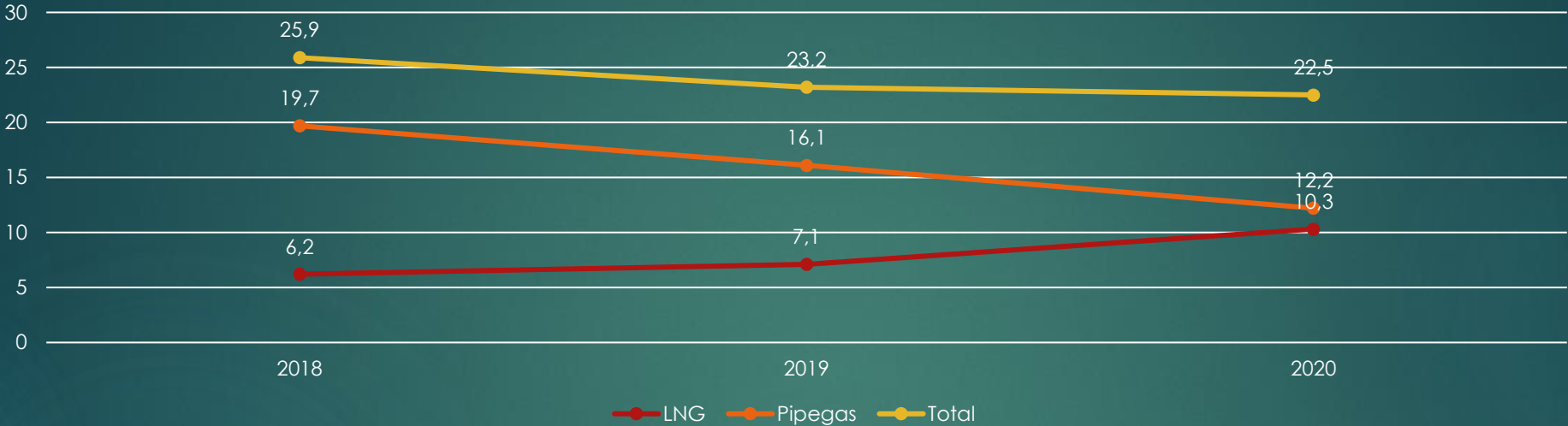
Nov 10: The reactor pressure vessel for UNIT 1 delivered

Nov 17: Construction licence for UNIT 3 issued

Natural Gas News of Pandemic Era

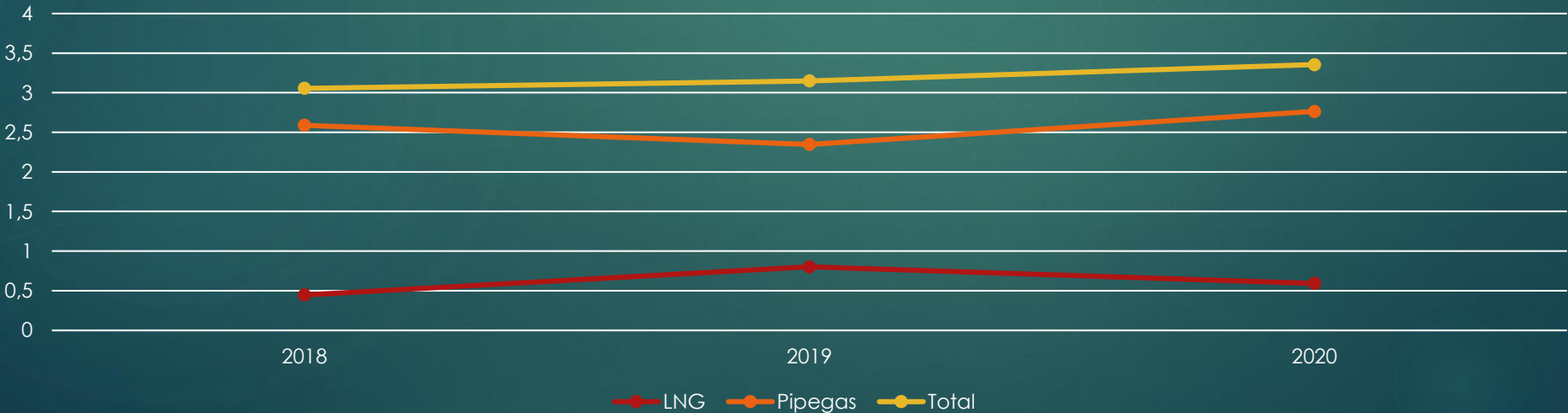
Natural Gas Imports 1st Half of the Year 2018-2020

(bcm, Source: GAZBİR)



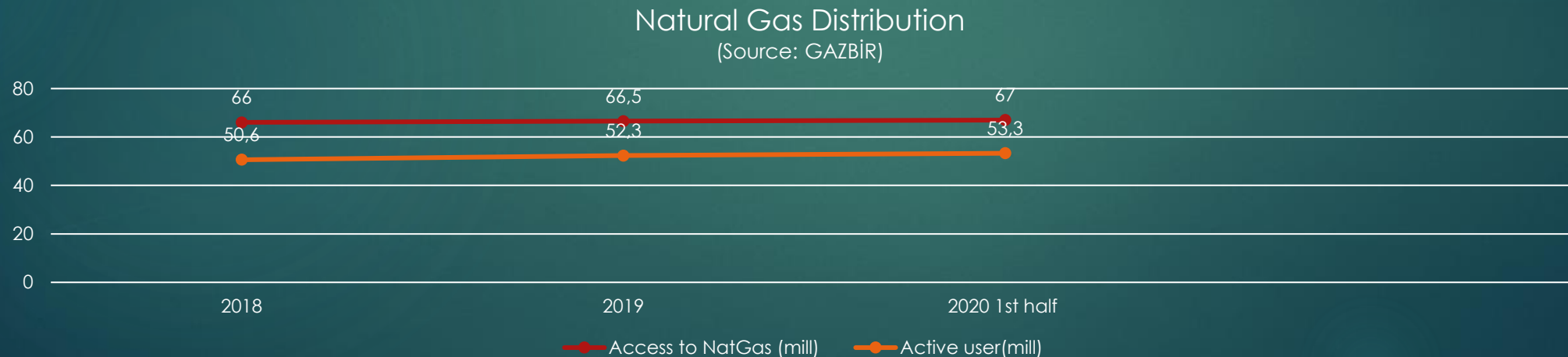
Natural Gas Imports August 2018-2020

(bcm, Source: GAZBİR)



Natural Gas News of Pandemic Era

- Turkstream Pipeline delivers gas to Turkey, Bulgaria, Greece, North Macedonia, Jan 1, 2020
- Southern Corridor Progress: Jul 1, 2019 TANAP ready to deliver TAP
Oct 12, 2020 after four and a half years TAP complete
Nov 15, 2020 TAP started commercial operation
- The third FSRU Project Saroz delayed, fierce NGO resistance
- “Tuz Gölü Expansion” and “Silivri Phase III” underground storage projects on truck
- Distribution network expansion continued



Natural Gas Exploration News of Pandemic Era

Black Sea

- Mar 2020 Third drillship of TPAO, Kanuni arrived in Turkey
- Jul 2020 Fatih drillship started to drill the Tuna-1 ultra-deepwater well in the Sakarya Field
- Aug 2020 Discovery of 320 bcm gas in the Tuna-1 well
- Oct 2020 Tuna-1 well completed at 4,445 m depth, estimated reserves increased to 405 bcm
- Nov 2020 Fatih drillship started with second well Türkali-1 in the Sakarya field
- Nov 2020 Kanuni drillship sets sail for Black Sea for operations in early 2021



Source: www.enerjiekonomisi.com

Mediterranean

- Apr 2020 Yavuz drillship started drilling of Selçuklu-1 well in the Mediterranean
- Oct 2020 Yavuz finalized drilling of the Selçuklu-1 well

- Apr-Nov 2020 Barbaros Hayreddin Paşa and Oruç Reis research vessels collected 2D and 3D seismic data off-shore Cyprus and Antalya areas

ELECTRIC CAR NEWS OF PANDEMIC ERA

- Indigenous Turkish electric car TOGG: Ground-breaking ceremony July 2020, Roll out of first car late 2022
- Ford announced the roll out of all-electric commercial vehicles from Gölcük factory in 2022

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**	261	9,788	10,049***

(Source: TEHAD)

* Excluding direct imports of individuals

** As of September 30, 2020

*** 3.1% of total car sales



Source: wrightcoating.com

ELECTRIC VEHICLE CHARGING STATIONS

(excluding private charging Stations)

2011: 15  2019: ~ 600  2020: ~ 2,000

Infrastructure is growing fast in metropolitan areas



Energy Exchange Istanbul News of Pandemic Era

EXIST Energy Exchange Istanbul

Established in March 2015

Electricity market operations:

- Day ahead market,
- Intra-day market,
- Balancing market,
- Market registration process,
- Market Settlement
- Power Futures Market postponed to 1 June 2021

Natural gas market:

- 1 Sept 2018: Organized Natural Gas Market has started
- 1 June 2020: Natural Gas Market Weekly Products has launched



Thank you

HYY629@YAHOO.COM