UNION OF CHAMBERS OF TURKISH ENGINEERS AND ARCHITECTS (UCTAE)
CHAMBER OF MECHANICAL ENGINEERS (CME)
ENERGY COMMISSION

TURKEY ENERGY OUTLOOK 2020

https://enerji.mmo.org.tr/

MAY 2020

Foreword (1)

To benefit from energy is an essential human right and necessity of modern ages. From our point of view, energy sources belong to the society and at all stages, starting from survey and exploration, locating, exploiting and until generation, transmission, distribution and sales, negative effects to the environment, nature and society should be minimal and welfare of the society must be respected and upheld. This criterion should be applicable to all activities related with energy. Supplying energy to all consumers adequately, with good quality, at low cost, reliably and consistently must be a fundamental policy. Such an understanding and approach points out the fact that all the activities to meet energy requirements should be realized as public service .

According to social state understanding, supply and providing energy requires public services. There is an organic relation between generation, transmission and distribution of electrical energy and these activities cannot be handled separately. Thus, these activities should be carried within a public scheme that will respect society, public and country benefits and will be construed with a democratic and participative understanding. All activities regarding supply and providing electricity, gas and water to consumers are public services for public welfare.

In Turkey, especially in the near past, losses in transmission and distribution and savings which could exceed 50% in some segments have been overlooked and policies trying to meet the increase in demand by new energy supply as well as protecting private sector benefits have been followed. Generally, imported energy sources were used to meet energy requirements and costly investments were made for imported fuels and external dependency in energy has increased significantly.

Foreword (2)

In contemporary societies, energy policies and activities should target supply of energy that would meet the requirements of citizens and community for proper justice, nutrition, housing, health, education, safe work and living conditions, transportation, communication, cultural and sportive activities and all consecutive requirements of before said services and planned economic activities; as a public service and effectively and productively and based on renewable resources at possible maximum level.

For a democratic energy plan and program aiming welfare of society, planning is a must.

This planning must be based on the criterion which will prioritize and concentrate on: more use of renewable resources, review energy consumption trends, consider demand side energy management, more efficient use of energy, manufacture of energy equipment locally, minimize negative effects to the environment and climate change, protection of rights and benefits of people living in regions where energy investments will be made and facilitate all these actions through participatory mechanisms.

An understanding and perspective that will: preserve and protect cultural and natural assets, not create environmental and social problems, respectful to individual and social rights, not deal with nuclear adventures, distant to privatization, outsourcing, and unsafe employment, aiming social welfare and efficient public entity and order must be attained.

Foreword (3)

- In present world; where oil, gas and coal monopolies are very powerful and active, high dependency on fossil fuels which counts 81% of primary energy will not face a significant decrease unless radical changes are made in the policies.
- Nowadays while sources are spent with a flagrant manner (at a rate high over society's actual needs), still 3 billion people do not have a wash basin to wash their hands and 2,7 billion people do not have a decent kitchen to cook in their homes. About one billion of people do not have access to electricity and hundreds of millions use primitive ovens for cooking and collect trash and plant and animal waste to use as fuel in these ovens. Moreover billions of people, including those living in developed countries face difficulties in benefiting from modern energy facilities due to their low purchasing power. In order to change this picture, it is necessary to release the energy sector from profit hegemony of monopolies and to move to a public sphere and to shift to a planned low carbon emission economy based on renewable energy resources and to realize democratic control / program in energy.

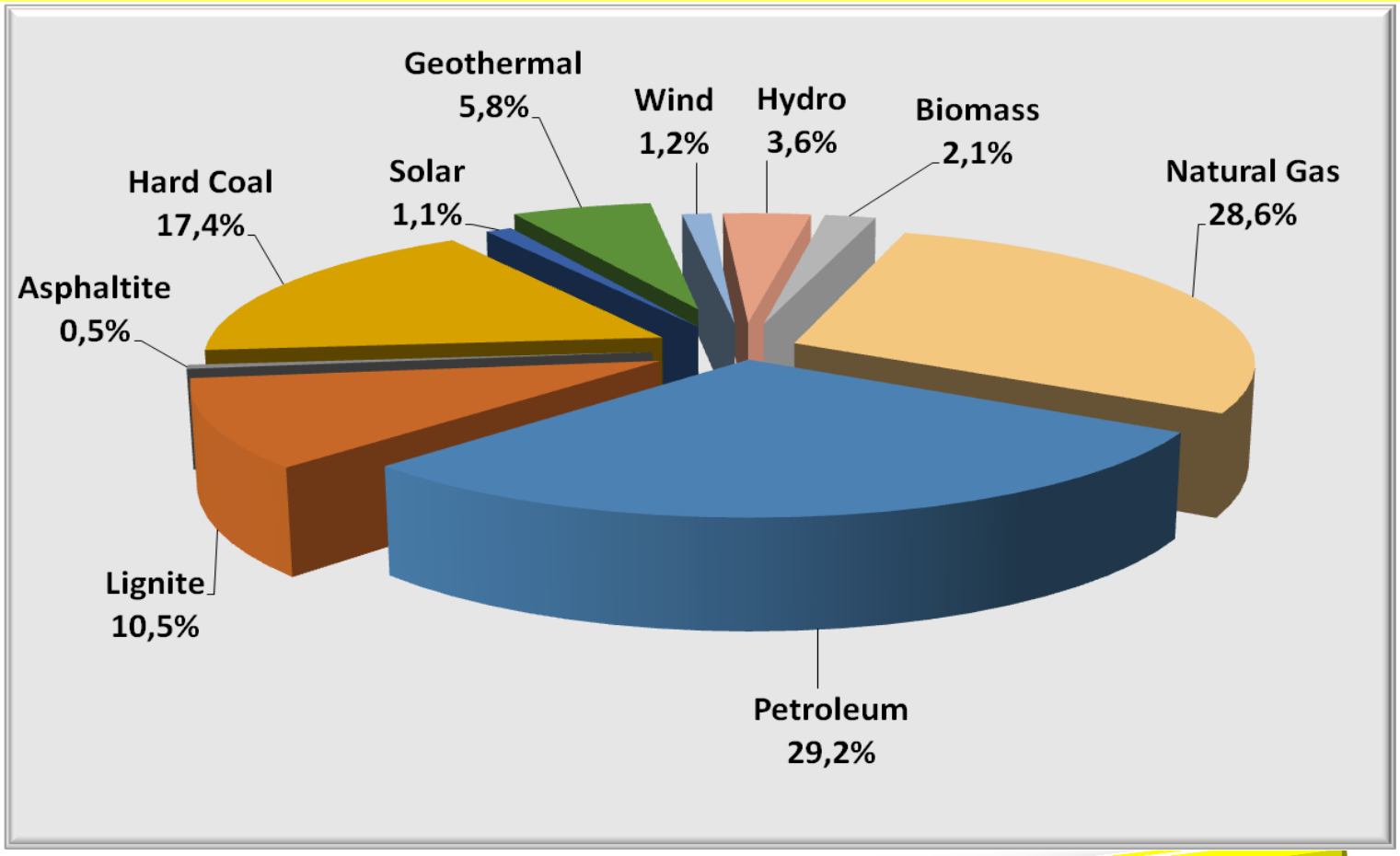
Foreword (4)

- To offset negative effects of air and environmental pollution to lives of human beings and society, to limit adverse effects of climate crisis which endanger human beings and nature such as droughts, the rise of temperatures in seas, the decline of underground water resources, unexpected heavy rains and floods irregular rains, temperature increase which has a tendency to increase rapidly must be limited maximum at a level of 1,5-2 ºC and to decrease the share of fossil fuels in energy supply in a radical and decisive manner.
- World Meteorological Organization (WMO) has announced that world temperature has increased by 1,1 +/- 0,1 ºC compared to pre-industrialization era and 2019 was the second hottest year and last five years were the most hot years. Since 1980, every ten years period was hotter than the previous one. All these data are the evidences to struggle for a different energy policy and program.

Turkey
Primary Energy Supply

Source: MENR-EİGM

Turkey Primary Energy Supply 2018 by Resources
Total 143,7 Million TOE, per Person 1,75 TOE
(Turkey Total 145,3 MTOE in 2017, 1,80 TOE per Person, IEA Members Average per Person 4,5 TOE)

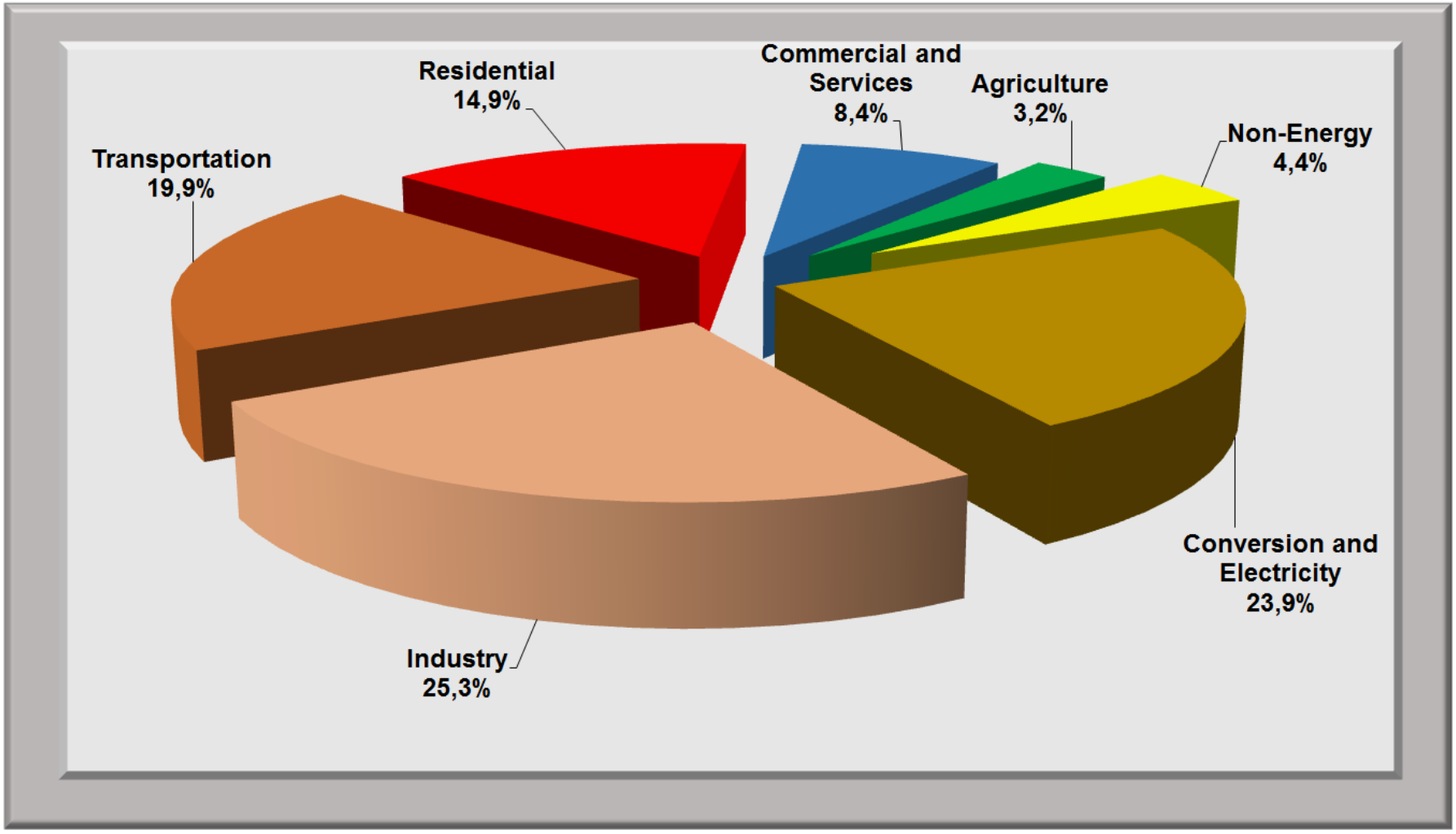


Share of Import %72,8
Share of Fossil Resources %86,3

Source: MENR-EİGM

Sectoral Consumption of Primary Energy of Turkey (Incl. Electricity Generation) 2018

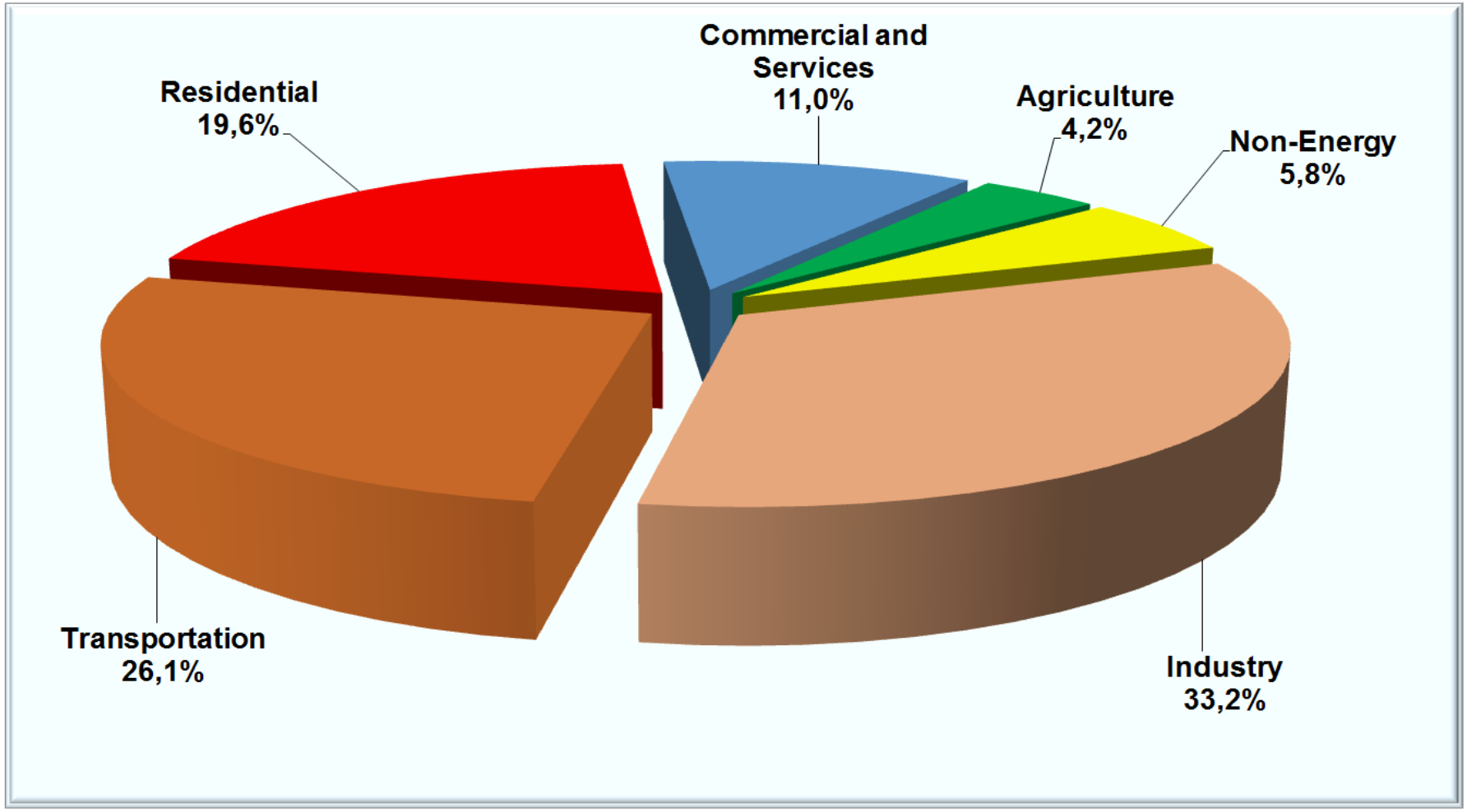
Total 143,7 Million TOE



Source: MENR-EİGM

Sectoral Consumption of Primary Energy of Turkey (Excld. Electricity Generation) 2018

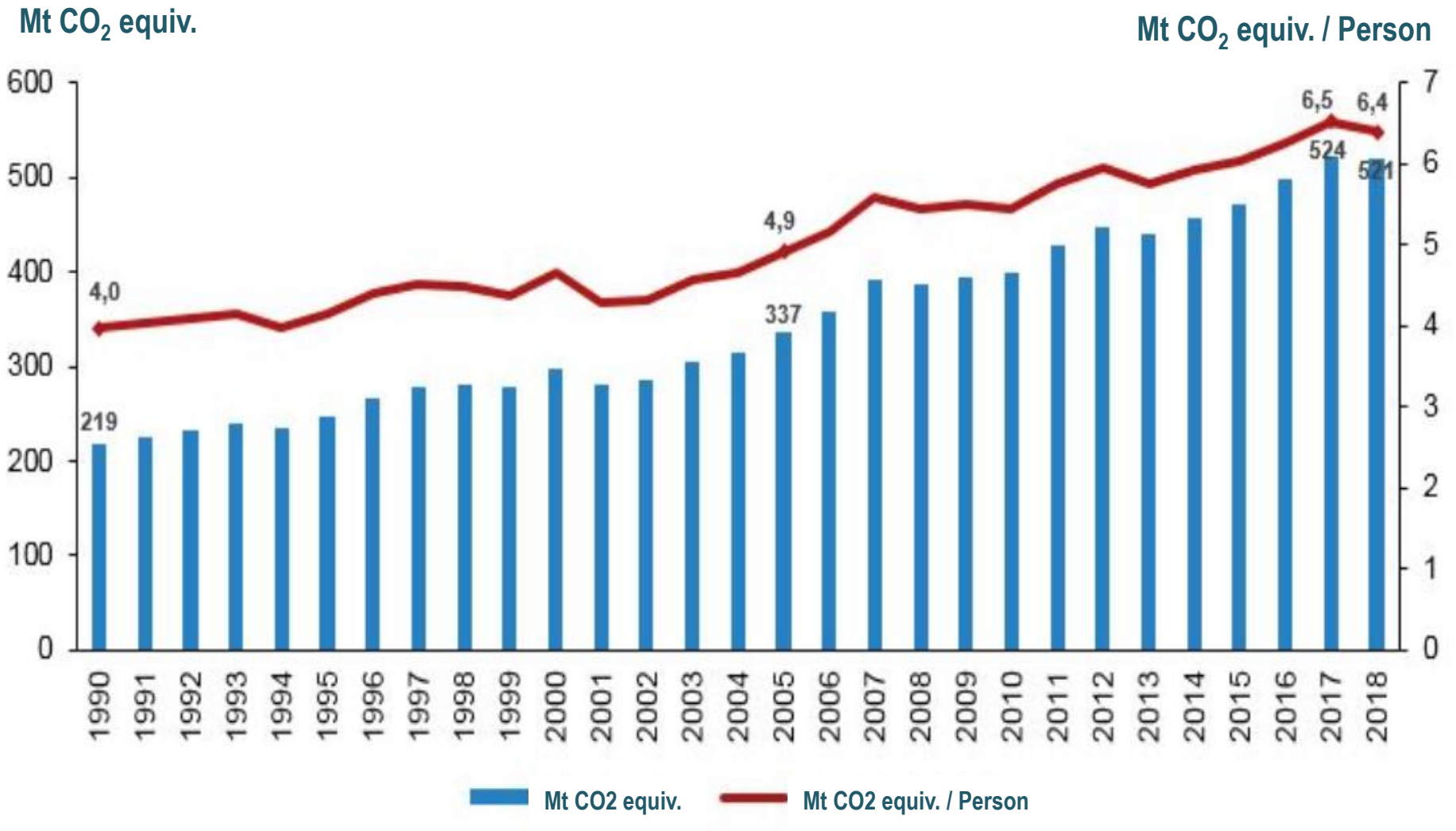
108,8 Million TOE



Source: MENR-EİGM

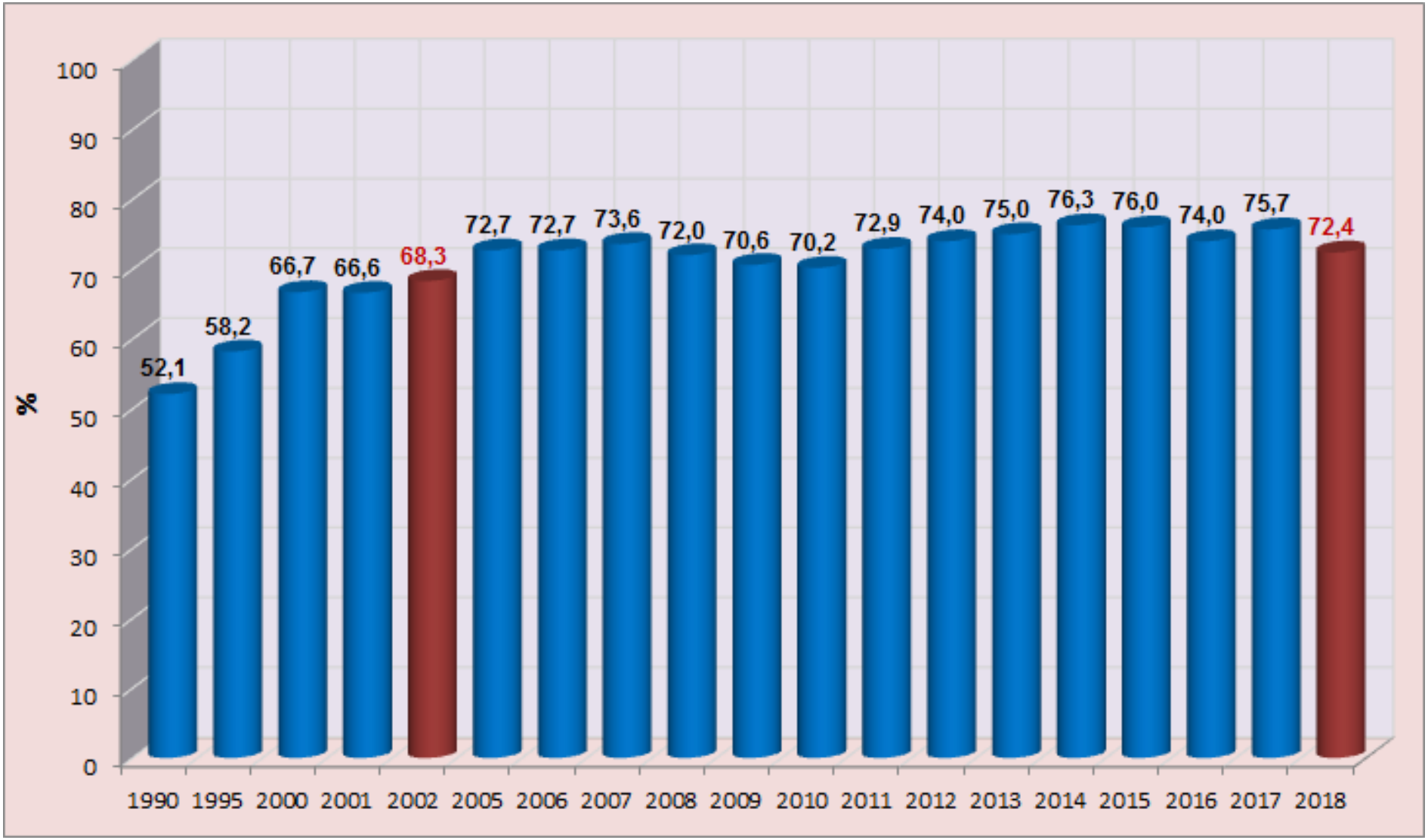
Greenhouse Gas Emissions of Turkey
Total and Per Person CO_2 Equiv. (1990-2018)

Total Greenhouse Gas Emission per capita, 1990-2018



TurkStat, Greenhouse Gas Emissions Statistics, 1990 - 2018, 1 April 2020

Increase of External Dependency in Primary Energy Supply of Turkey, 1990-2018 (%)



Source: MENR-EİGM

Turkey General Energy Balance, 1990 – 2018

	1990	2002	2017	2018	CHANGE (%)	
					1990-2018	2002-2018
Total Energy Demand (Million TOE)	52,5	77,1	145,3	143,7	173,8	86,4
Total Indigenous Product (Million TOE)	25,1	24,4	35,4	39,7	57,8	62,4
Total Energy Import (Millin TOE)	30,7	57,2	124,4	115,8	277,6	102,6
Share of Indigenous Product (%)	47,9	31,7	24,3	27,6	-42,4	-12,9

Source: MENR-EİGM, Access Date 05.03.2020

Energy Raw Materials Imports of Turkey (1)

Resource	2018		2019		2019-2018	
	Million US Dollar	Share in Total İmport %	Million US Dollar	Share in Total İmport %	Difference (Million US Dollar)	Change %
Coal and Lignite Exploiting	4.385	10,1	3.519	8,5	-866	-19,7
Crude Oil and Natural Gas (Secret Data)	22.911	52,7	26.582	63,9	3.671	16,0
Coke, Refined Petroleum Products	16.160	37,2	11.511	27,7	-4.649	-28,8
Total Energy Import	43.456	100,0	41.612	100,0	-1.844	-4,2
Total Import	231.152		210.347		-20.805	-9,0

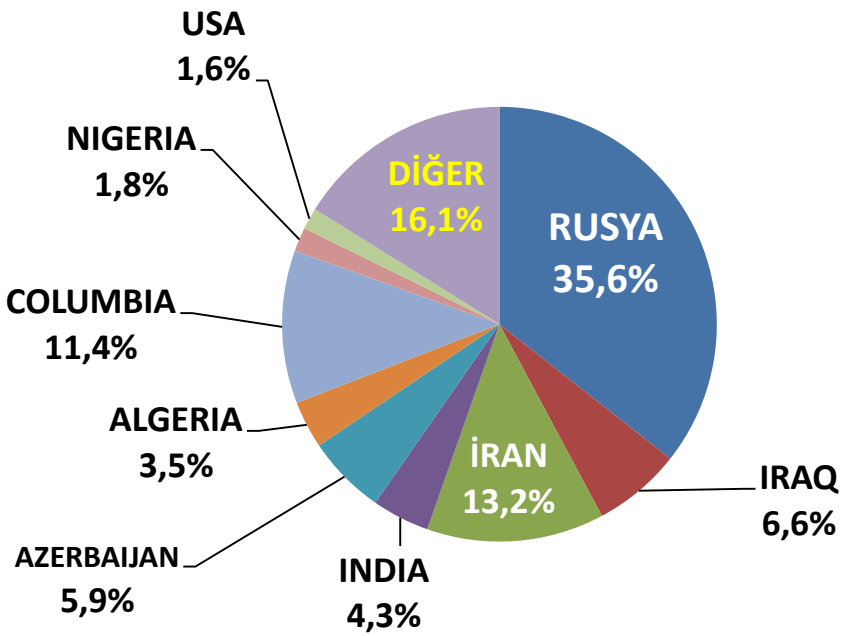
Source: Ministry of Treasury and Finance, Compiled by Mustafa SÖNMEZ

Energy Raw Materials Imports of Turkey (2)

- **Energy raw materials imports of Turkey reached its peak in 2012 with a figure of 69 Billion USD. Imports decreased in the following years and shrank to 27,2 Billion USD in 2016. Import bill restarted to increase in 2017 and reached 37,5 Billion USD. Imports totaled to 43,5 Billion USD in 2018 and 41,6 Billion USD in 2019. It can be said that the import bill will be even less in 2020 due to diminishing demand, due to virus pandemic and the drop in oil prices.**

External Dependency in Turkey Primary Energy Supply, 2018

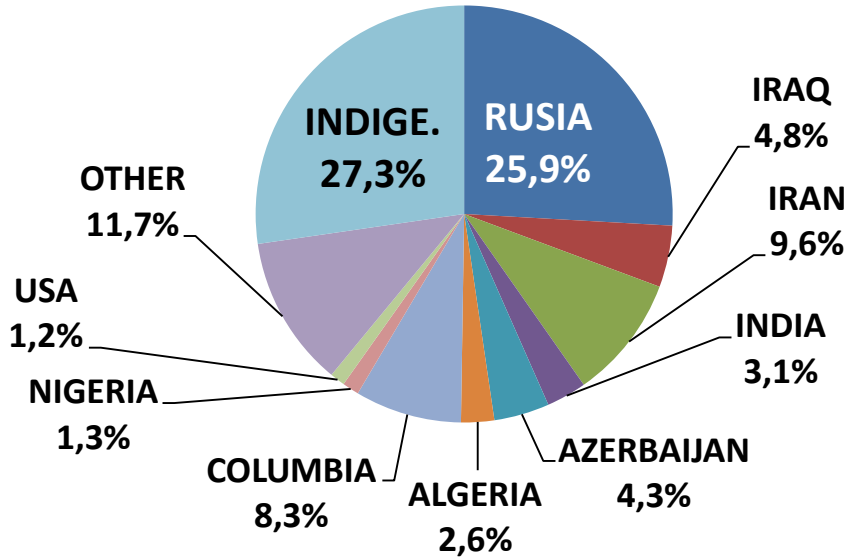
TOTAL PETROLEUM, NATURAL GAS and COAL IMPORT (MTOE) RATIO



110 Million TOE

IMPORTED AND DOMESTIC TOTAL ENERGY SUPPLY (MTOE) RATIO

Share of Import 72,7%



143,7 Million TOE

1 TOE is Equivalent to; 0,952 tonnes of Crude Oil, 0,997 tonnes of Petroleum Product, 1,6 tonnes of Hard Coal and 1.212 m^3 Natural Gas.

Source: National Energy Balance Tables (2018) by MENR; Petroleum and Natural Gas Sectoral Report (2018) by EMRA; Coal Sectoral Report (2018) by TKİ

Electricity Consumption Targets of Turkey per Person

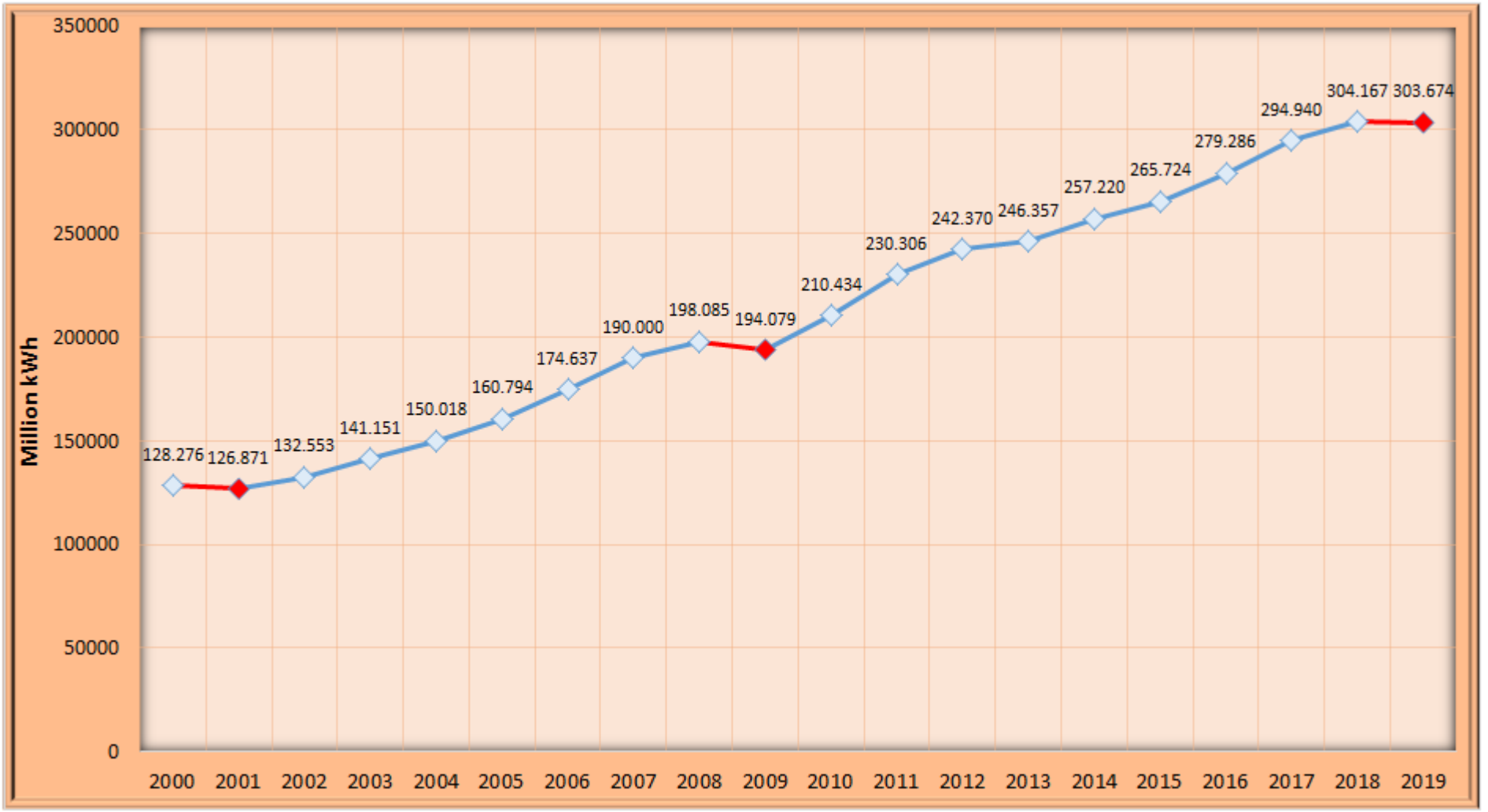
YEAR	ANNUAL ECTRCICTY CONSUMPTION TARGETS PER PERSON
2018	3709
	3516 (*)
2019	3652
	3464 (*)
2020	4.800 - 5.000
2023	5.500 - 6.000
2030	> 7.000
2040	> 8.000

(*) By Including Temporarily Residents in Turkey (Approx. 4,5 Million)

Demand forecasts for the future should be reconsidered noting previous trends in demand and also noting population increase expectations.

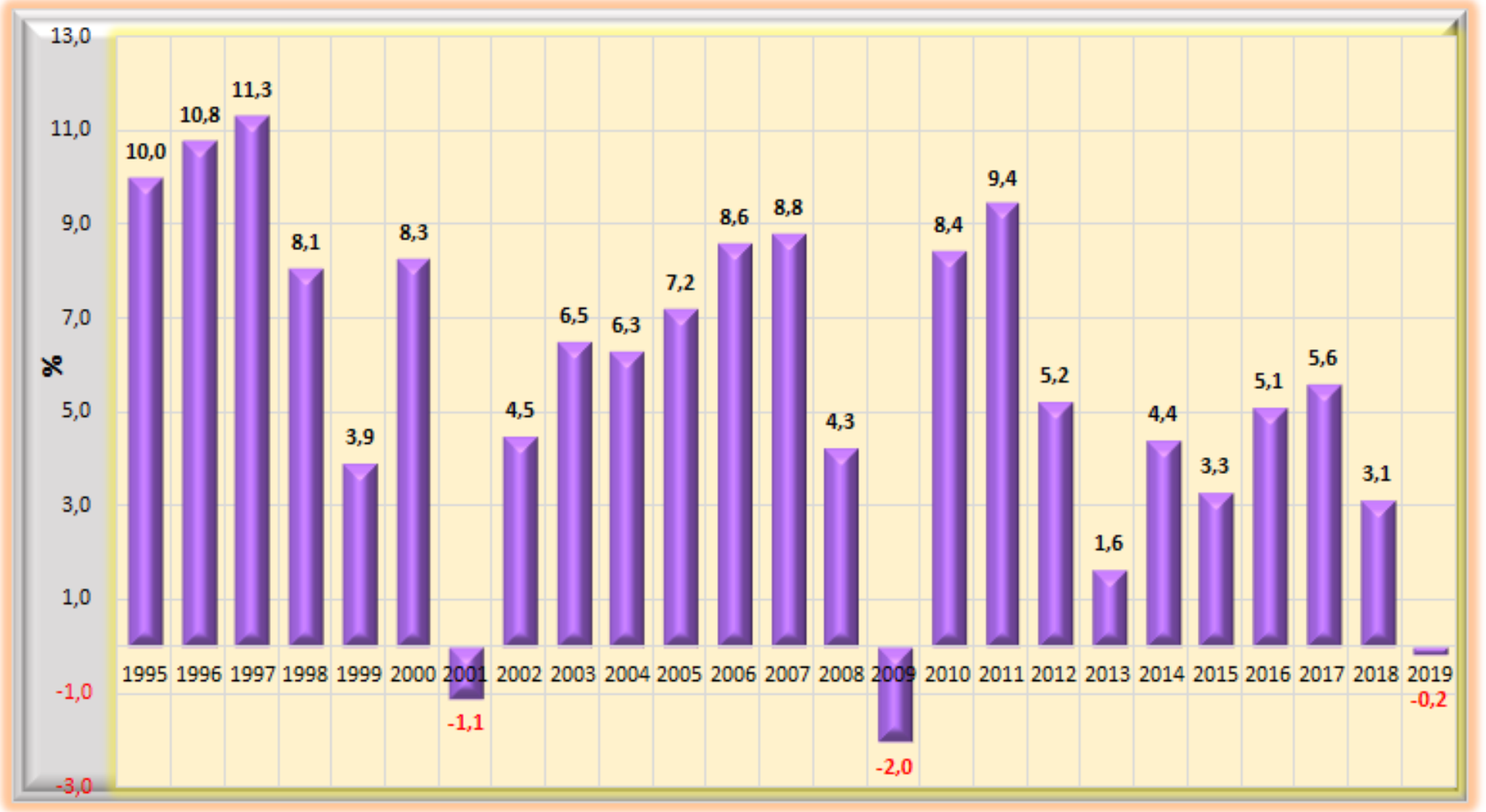
- **IEA member countries had an average of 9 900 kWh per person per annum. Turkey targets to reach such a figure after 2040.**
- **Developed countries aim more efficient use of energy. Turkey should emphasize more on increasing energy efficiency and decreasing energy density rather than increasing energy consumption drastically.**

Electricity Consumption in Turkey, 2000 – 2019 (GWh)



Source: https://www.teias.gov.tr/tr/iii-elektrik-enerjisi-uretimi-tuketimi-kayiplar

Annual Change in Electricity Consumption 2000-2019 (%)



Source: https://www.teias.gov.tr/tr/turkiye-elektrik-uretim-iletim-istatistikleri

Electricity Demand Forecasts (MENR)

NEW SERIES						
	Reference Demand (TWh)	Increase of Reference Demand (%)	High Demand (TWh)	Increase of High Demand (%)	Low Demand (TWh)	Increase of Low Demand (%)
2018	300,1	1,8	300,1	1,8	300,1	1,8
2019	315,2	5,0	316,5	5,5	313,8	4,6
2020	329,6	4,6	332,1	4,9	327,3	4,3
2021	344,4	4,5	348,7	5,0	340,5	4,0
2022	359,6	4,4	366,4	5,1	353,2	3,7
2023	375,8	4,5	385,2	5,1	366,8	3,9
2024	392,1	4,3	404,3	5,0	380,4	3,7
2025	406,9	3,8	422,3	4,5	392,6	3,2
2026	421,8	3,7	440,7	4,4	404,6	3,1
2027	436,6	3,5	458,9	4,1	416,6	3,0
2028	451,7	3,5	477,6	4,1	428,8	2,9
2029	466,8	3,3	496,6	4,0	441,0	2,8
2030	481,7	3,2	515,4	3,8	453,0	2,7

PREVIOUS SERIES						
	Reference Demand (TWh)	Increase of Reference Demand (%)	High Demand (TWh)	Increase of High Demand (%)	Low Demand (TWh)	Increase of Low Demand (%)
2018	304,4	4,9	307,2	5,2	301,5	4,6
2019	319,5	4,9	323,8	5,4	315,8	4,7
2020	335,0	4,9	343,2	6,0	328,4	4,0
2021	350,7	4,7	363,4	5,9	341,0	3,8
2022	367,3	4,7	384,9	5,9	354,2	3,8
2023	384,6	4,7	407,9	6,0	367,9	3,9
2024	402,3	4,6	431,7	5,8	381,8	3,8
2025	420,5	4,5	456,5	5,7	396,1	3,8
2026	439,2	4,7	482,3	5,7	410,5	4,1
2027	457,9	4,7	508,6	5,8	425,0	4,0
2028	477,0	4,7	535,9	5,9	439,5	3,9
2029	496,5	4,7	564,1	5,8	454,1	3,9
2030	516,0	4,7	592,8	5,8	468,4	3,9

Presidency Program for 2019 Demand Forecast for 2019 as 317.022 GWh.

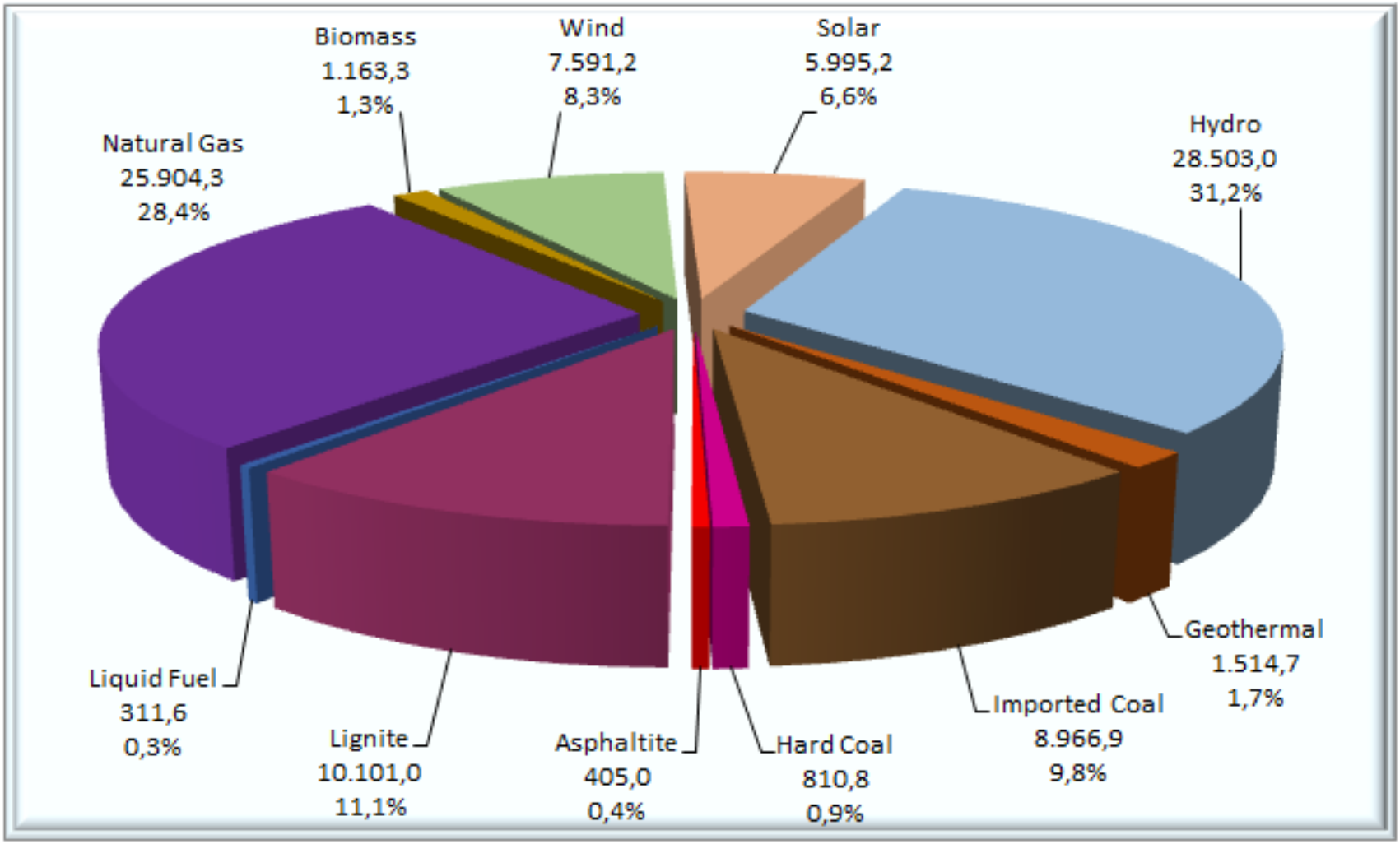
https://enerji.gov.tr/File/?path=ROOT%2f1%2fDocuments%2fE%c4%b0GM%20Ana%20Rapor%2fT%c3%bcrkiye%20Elektrik%20Enerjisi%20Talep%20Projeksiyonu%20Raporu.pdf

Comparison of Electricity Demand Forecasts

	ANNUAL AVERAGE INCREASE (%)		FORECAST FOR 2030 (TWh)	
	NEW DEMAND SERIES	PREVIOUS DEMAND SERIES	NEW DEMAND SERIES	PREVIOUS DEMAND SERIES
REFERENCE SERIES	3,8	4,7	481,7	516,0
LOW DEMAND SERIES	3,4	4,0	453,0	468,4
HIGH DEMAND SERIES	4,4	5,8	515,4	592,8

- There are serious concerns about the methodology used in demand forecasts. There are major deviations between previous and following demand forecasts.
- We as CME claimed that forecasts are not realistic and are steep high. Last years figures verified our assumptions.
- Recent forecasts are still very high. Demand did not increase during 2019. 327,3 - 332,4 TWh demand forecast for 2020 can only be realized if electricity consumption increases by 9-10 % and this is impossible at existing crisis conditions. Forecasts that will be made for future should be realistic and based on scientific principles.
- MENR has not fulfilled its task to carry primary energy and electricity demand based on a scientific model. MENR should use a modern reliable forecast model.

Installed Capacity by Primary Resources 2019 (MW, %)

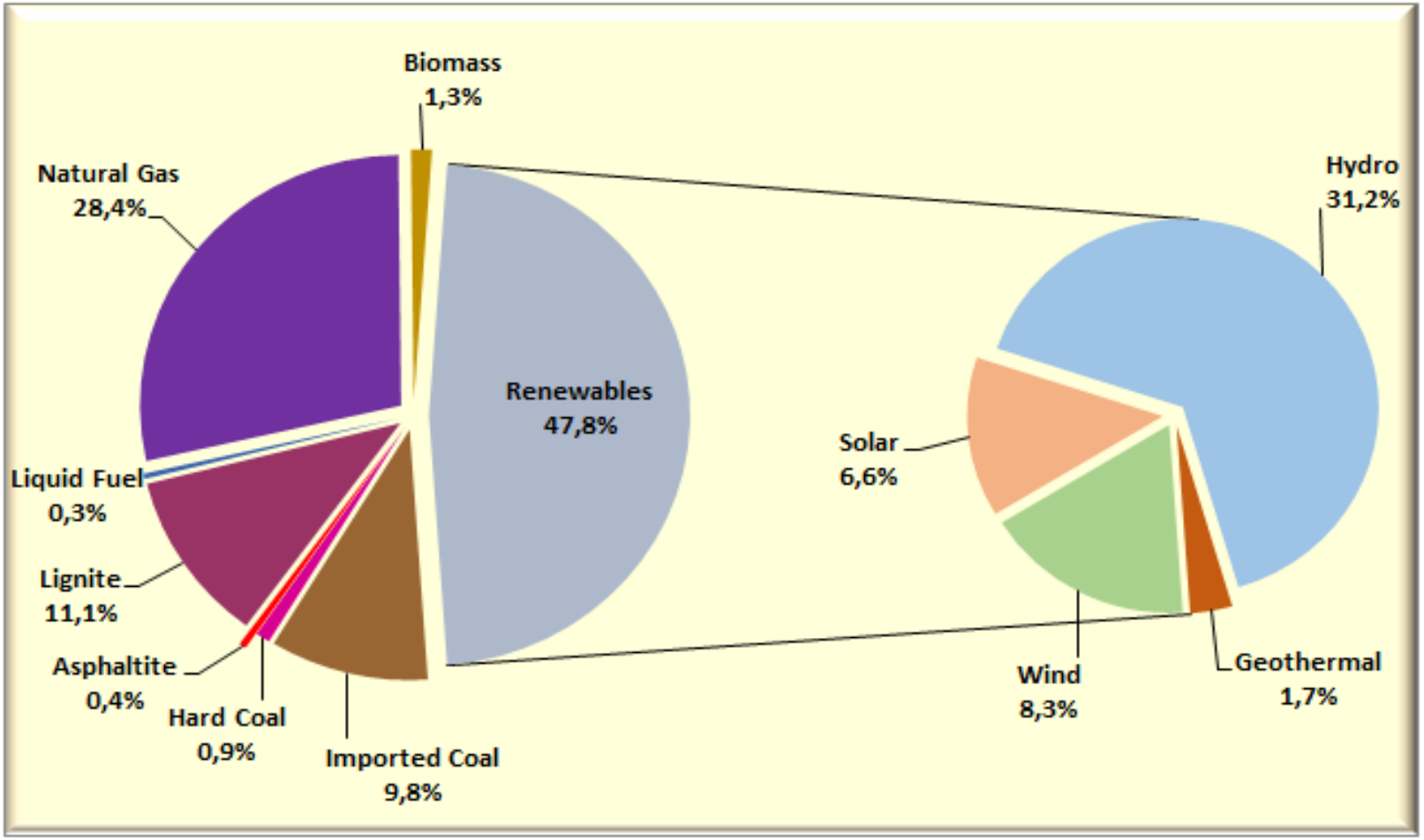


TOTAL INSTALLED CAPACITY as end of 2019 : 91.267 MW

Source: https://www.teias.gov.tr

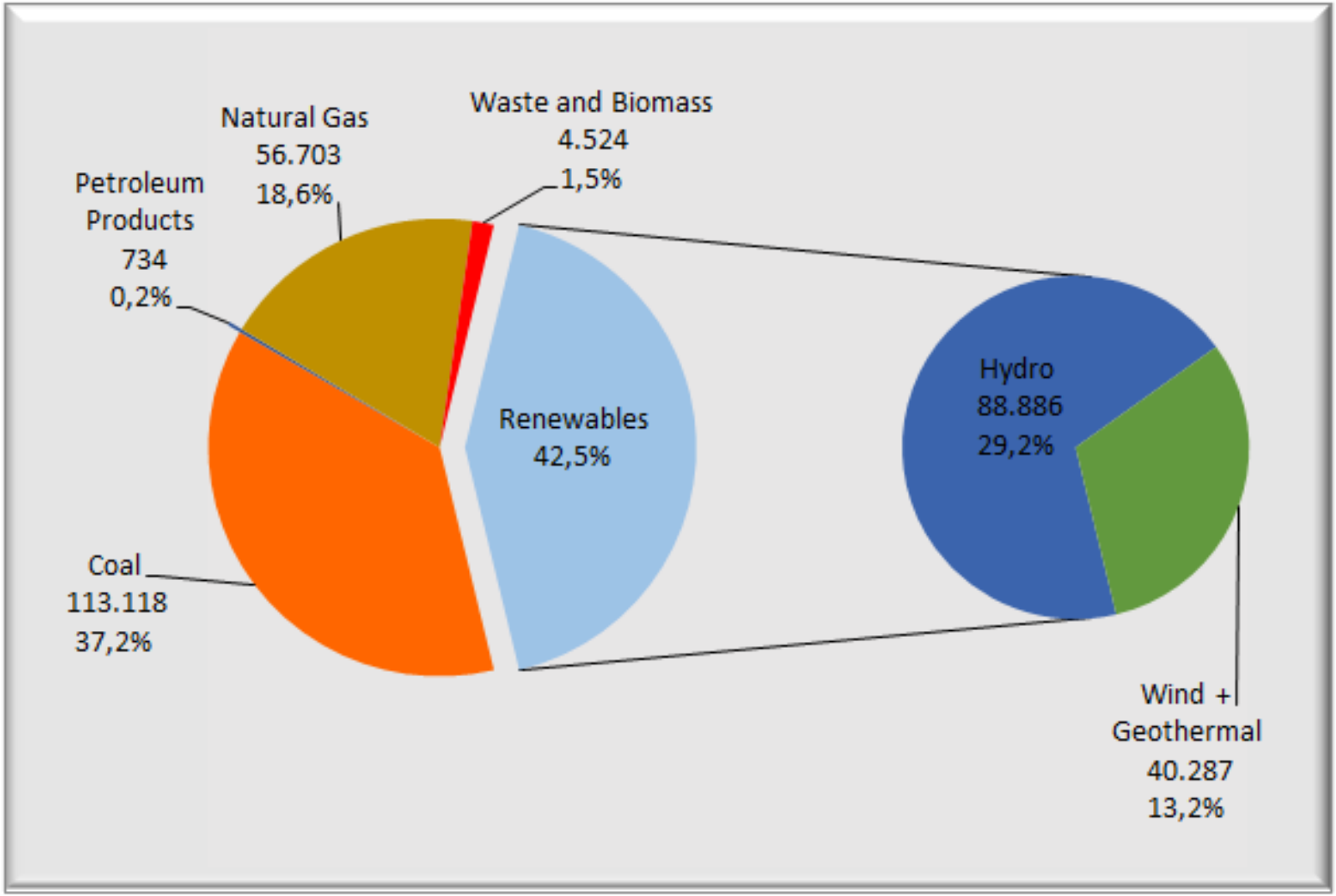
Installed Capacity by Primary Resources 2019 (MW, %)

FOSSIL RESOURCES	RENEWABLE RESOURCES
52,2%	47,8%



Source: https://www.teias.gov.tr

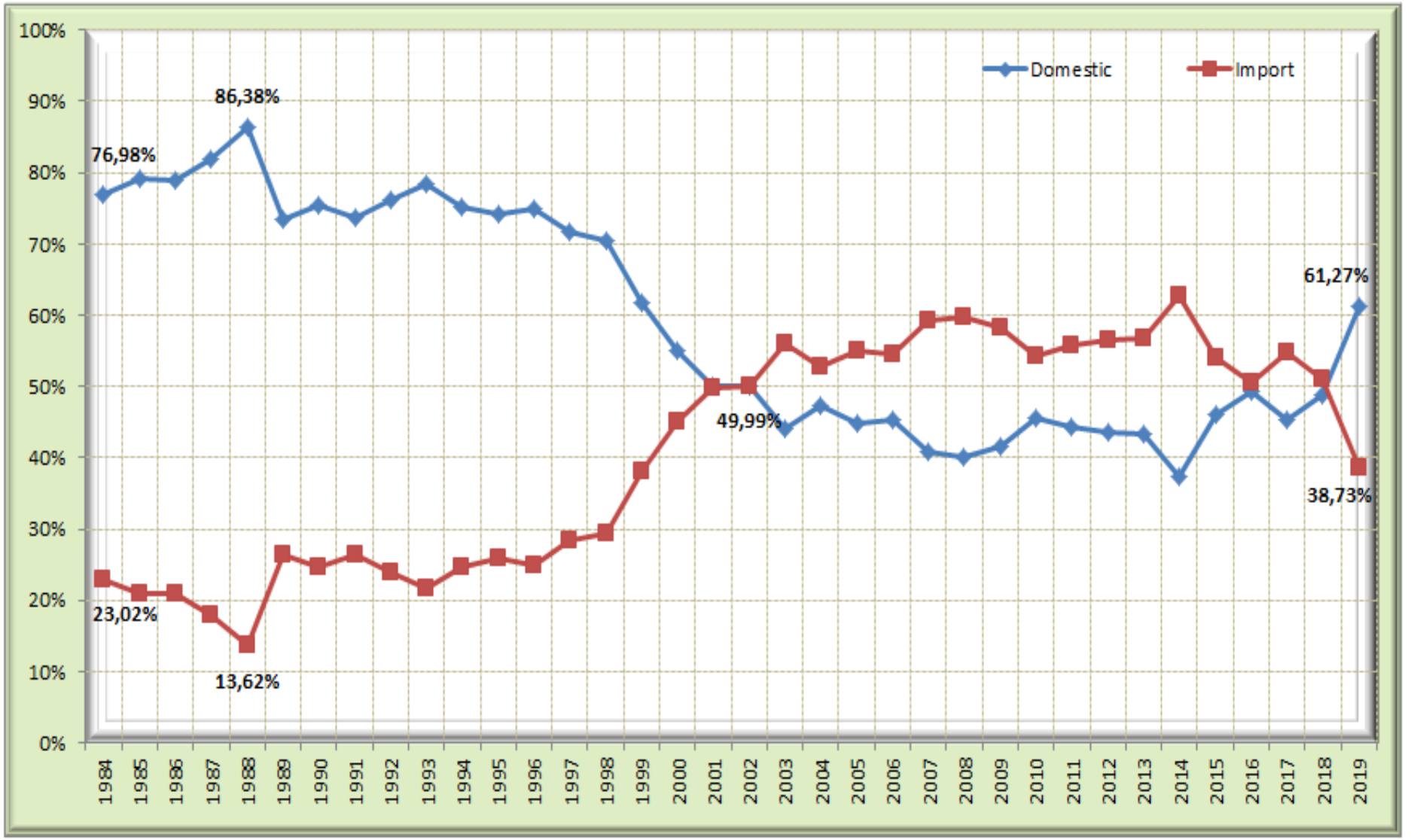
Electricity Generation by Primary Resources 2019 (Million kWh, %)



TOTAL ELECTRICITY GENERATION : 304.251,6 GWh

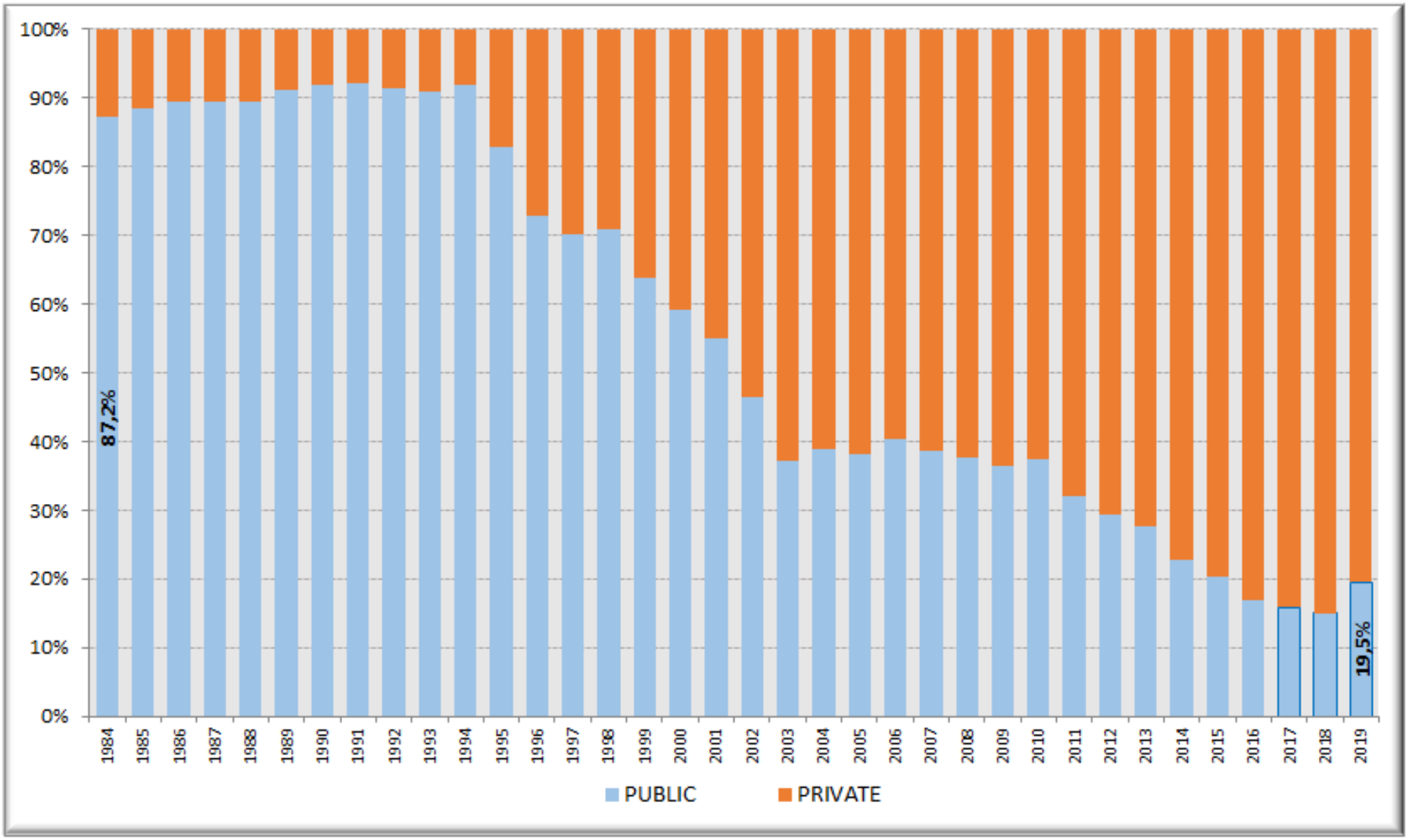
Source: http://www.teias.gov.tr

Shares of Domestic and Imported Resources in Electricity Generation, 1984-2019 (%)



Source: TEİAŞ

Annual Shares of Public and Private Sectors Between 1984 - 2019



Source: TEİAŞ

Electricity Generation-Consumption Balance (2018, 2019)

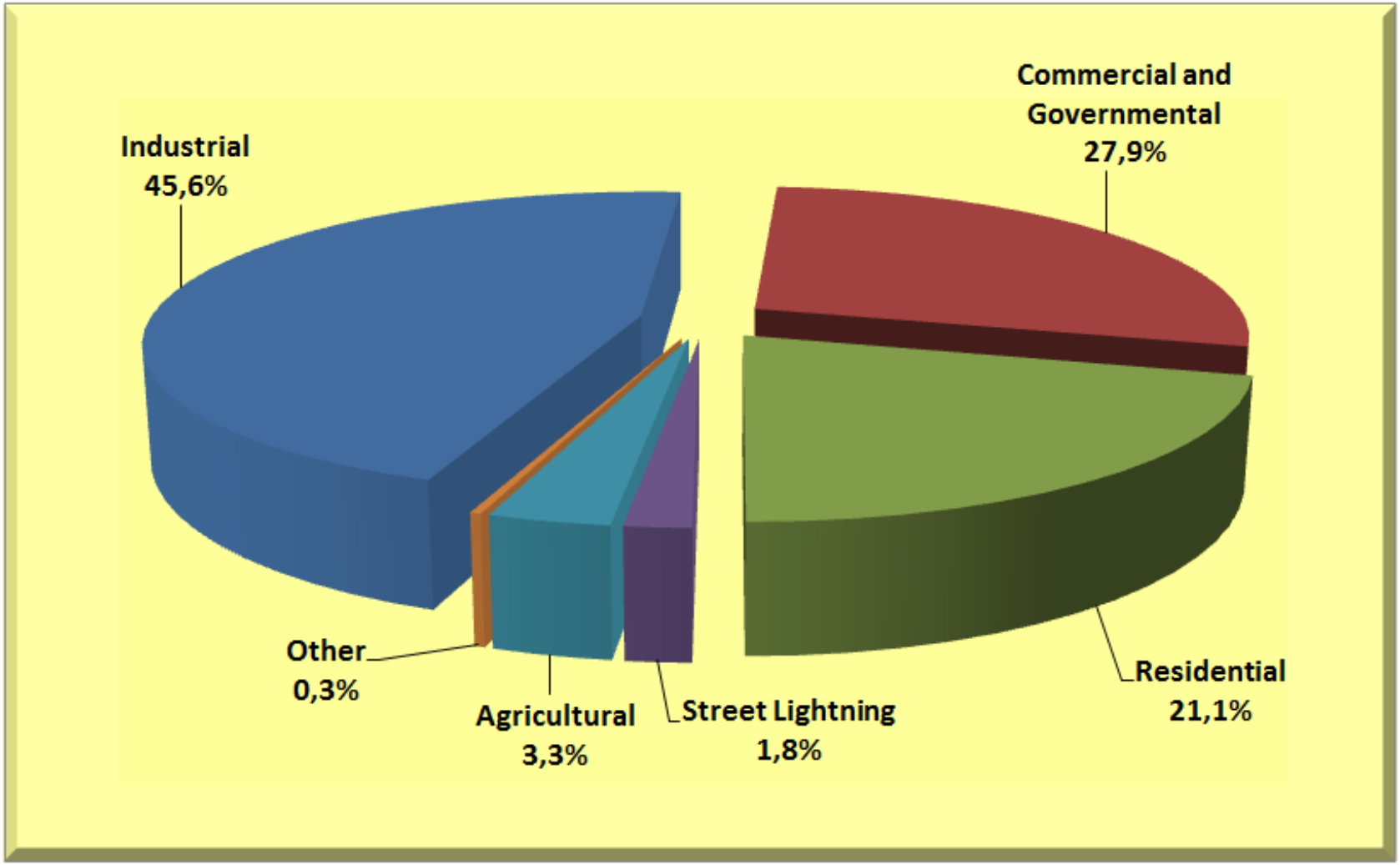
	TWh	
	2018	2019
Generation	304,8	304,3
Int. Consumption	14,3	14,3
Net Generation	290,5	290,0
Imports	2,5	2,2
Supply to Grid	293,0	292,2
Transmission Loss.	5,1	5,1
Distribution Loss	26,5	26,4
Exports	3,1	2,8
Net Consumption	258,2	257,9

Source: TEİAŞ

2019 Figures are temporary.

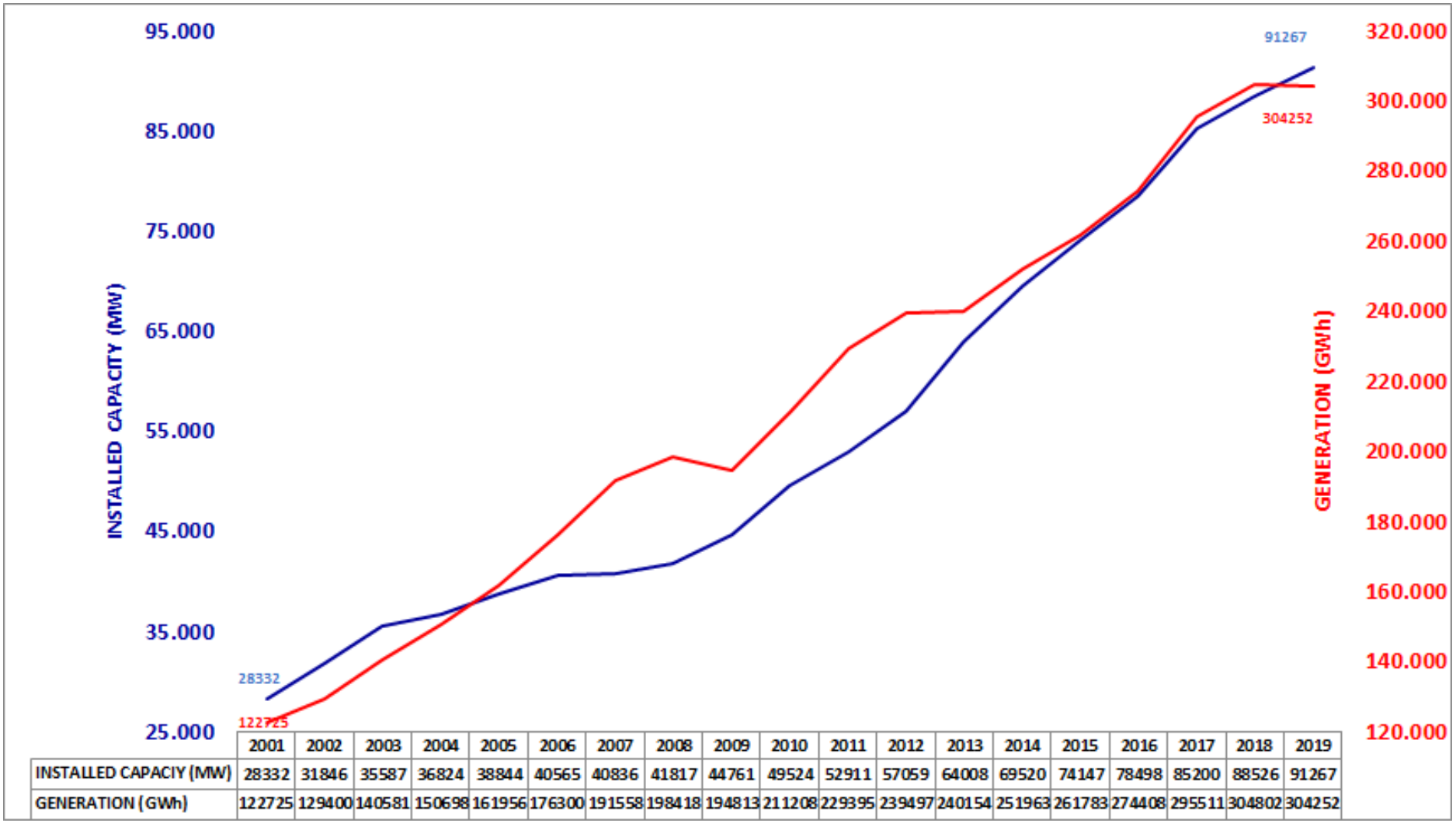
Electricity Consumption by Sectors, 2018

In 2018, total final electricity consumption was 258,2 Billion kWh and shares of end user sectors are shown below. Industrial consumption is the leader with 45,6% share.



Source: TEDAŞ

Change in Installed Capacity and Electricity Generation of Turkey (2001-2019)



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
INSTALLED CAPACIY (MW)	28332	31846	35587	36824	38844	40565	40836	41817	44761	49524	52911	57059	64008	69520	74147	78498	85200	88526	91267
GENERATION (GWh)	122725	129400	140581	150698	161956	176300	191558	198418	194813	211208	229395	239497	240154	251963	261783	274408	295511	304802	304252

Source: TEİAŞ

Turkey National Renewable Energy Action Plan (TNREAP-December 2014) MENR 2019-2023 Strategic Plan, MENR 2015-2019 Strategic Plan and Presidency 2019 Program Target Capa. vs. Actual Fig. Realization (MW)

	HYDRO	WIND	GEOTHE.	BİOMASS	SOLAR	TOTAL
TNREAP 2023 TARGET	34.000	20.000	1.000	1.000	5.000	61.000
STRG.PLAN 2023 TARGET (1 May 2020)	32.037	11.883	2.884		10.000	56.804
STRG.PLAN 2019 TARGET (2017 REVISION)	32.000	10.000	700	700	3.000	46.400
PRESIDENCY 2019 PROGRAM	29.796	8.361	1.498	842	6.433	46.930
2019 YEAR END	28.503	7.591	1.515	802	5.995	44.406

Installed Capacity based on renewable resources as end of 2019;

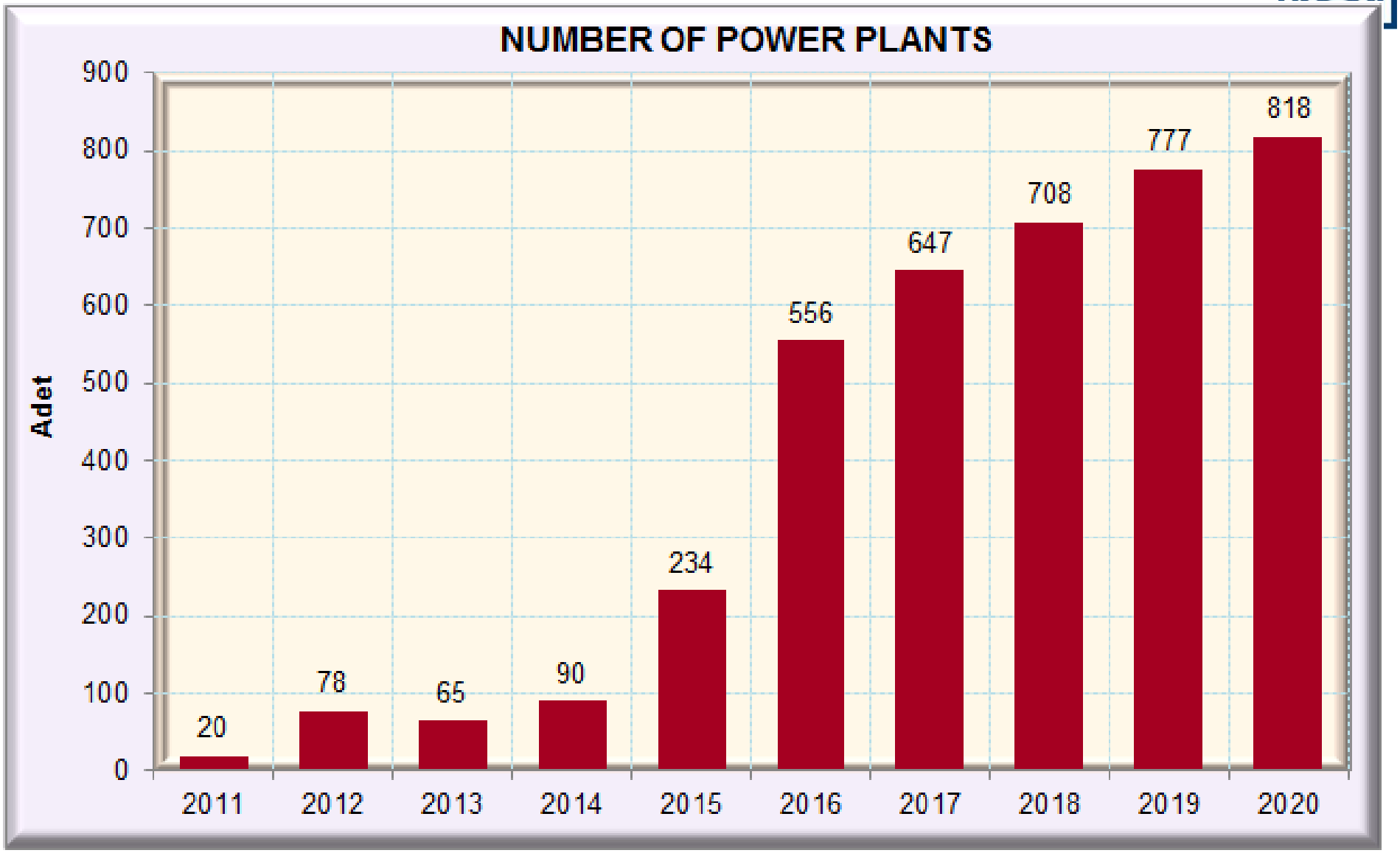
- Is 4,3% less than MENR STRG.PLAN 2019 TARGET
- Has to be increased by 37,4% in order to reach TNREAP 2023 TARGET
- Has to be increased by 28,0% in order to reach MENR STRG.PLAN 2023 TARGET

DEVELOPMENT OF RENEWABLE ENERGY RESOURCE SUPPORT MECHANISM (RERSM)

Number of Power Plants										
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Hydro	**4**	**44**	**19**	**40**	**126**	**388**	**418**	**447**	**463**	**461**
Run of River	3	43	19	39	125	337	365	390	404	405
Reservoir/Dam	1	1	0	1	1	51	53	57	59	56
Geothermal	**4**	**4**	**6**	**9**	**14**	**20**	**29**	**37**	**45**	**49**
Geothermal	4	4	6	9	14	20	29	37	45	49
Wind	**9**	**22**	**12**	**21**	**60**	**106**	**141**	**151**	**160**	**165**
Wind	9	22	12	21	60	106	141	151	160	165
Solar	**0**	**0**	**12**	**0**	**0**	**0**	**2**	**3**	**9**	**17**
PV	0	0	12	0	0	0	2	3	9	17
Biomass	**3**	**8**	**16**	**20**	**34**	**42**	**57**	**70**	**100**	**126**
Herbal and Animal Contaminant	0	0	2	4	10	13	20	27	41	66
Biogas	1	0	1	3	7	7	4	5	7	
Waste	2	8	13	13	17	22	32	35	49	60
Tire Contaminant	0	0	0	0	0	0	1	3	3	
Grand Total	**20**	**78**	**65**	**90**	**234**	**556**	**647**	**708**	**777**	**818**

RERSM RENEWABLE ENERGY RESOURCE SUPPORT MECHANISM

POWER PLANTS UNDER RERSM

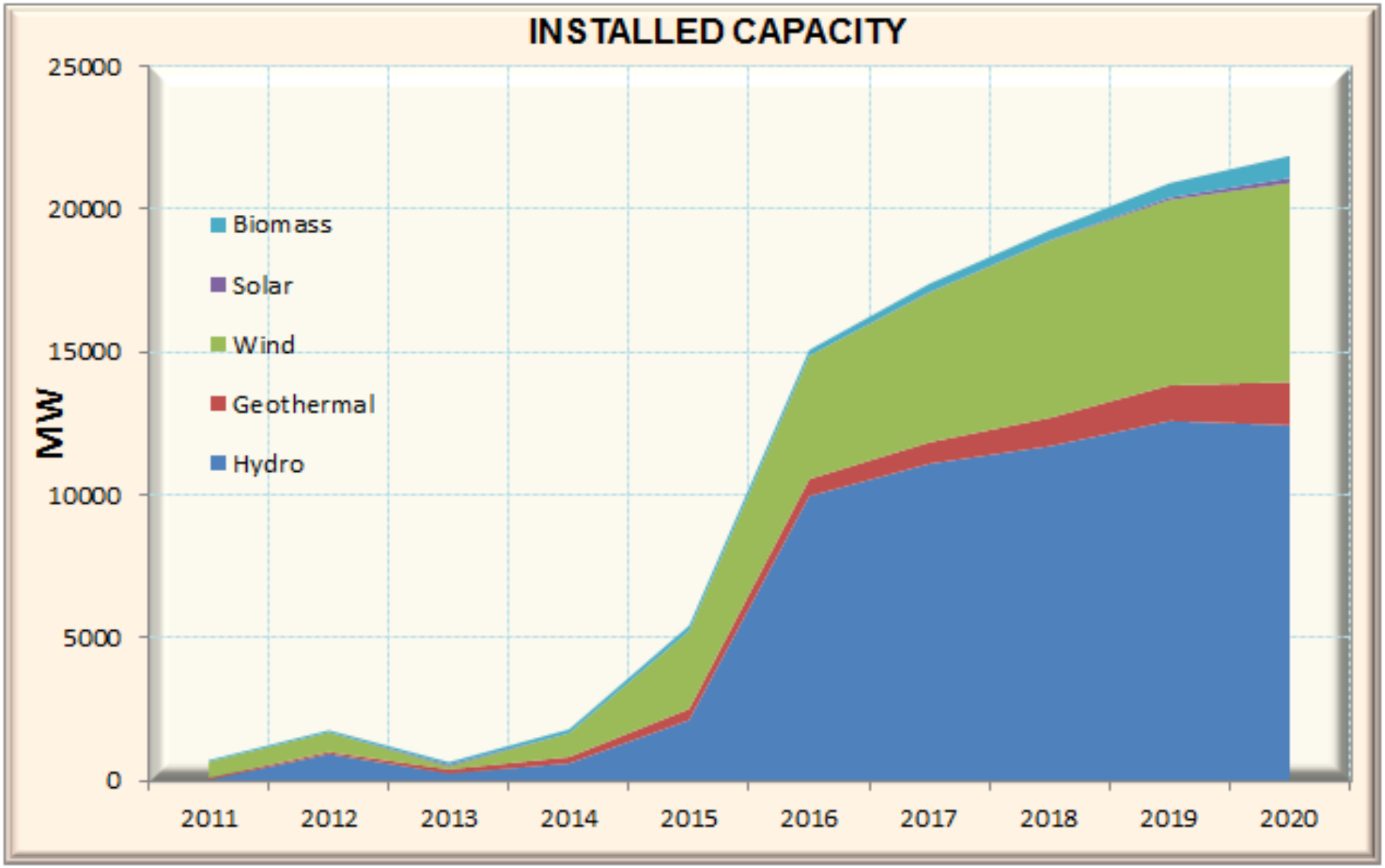


1.760 MW

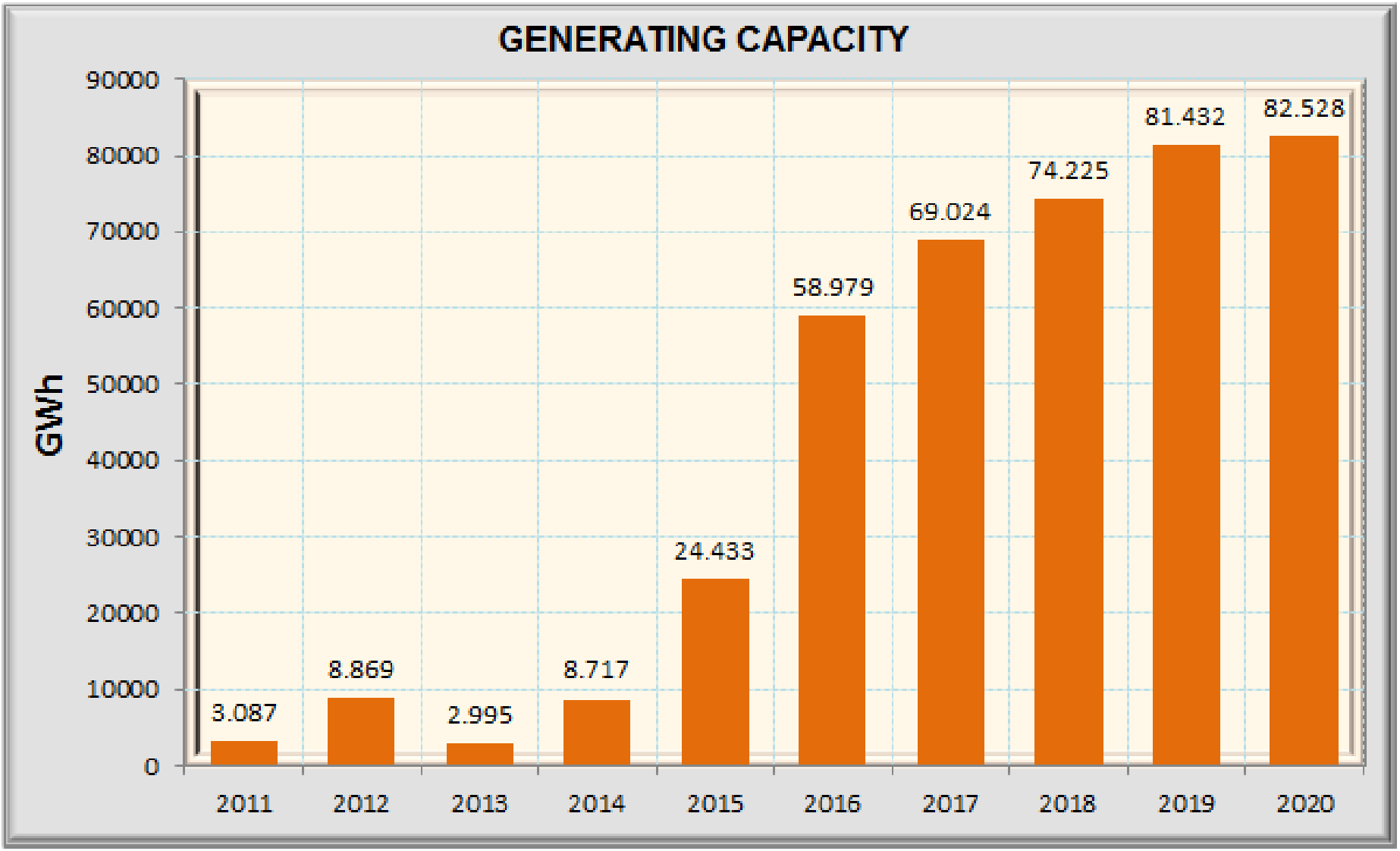
15.083 MW

21.877 MW

INSTALLED CAPACITY OF POWER PLANTS UNDER RERSM



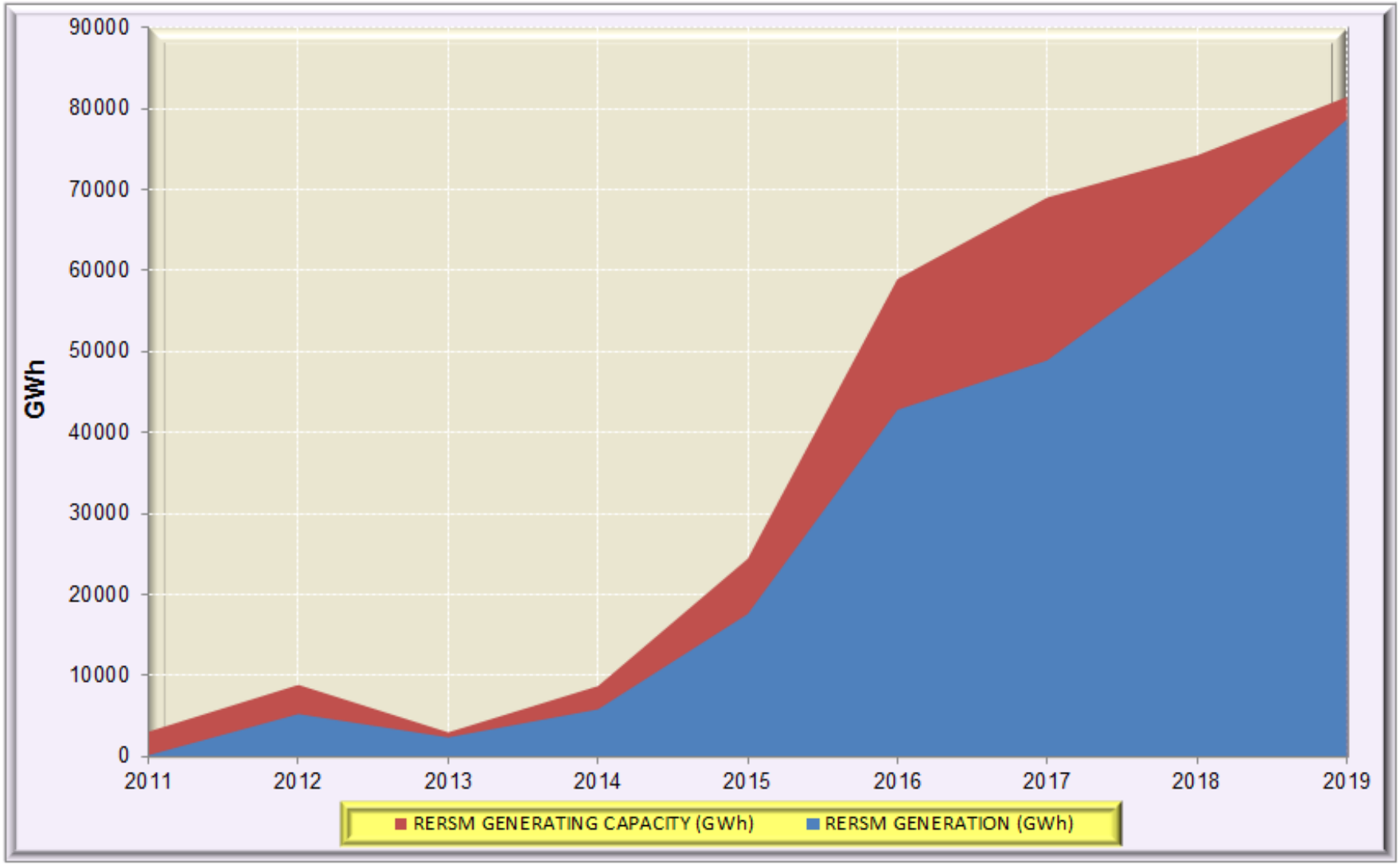
CHANGE OF TOTAL GENERATING CAPACITY OF RERSM



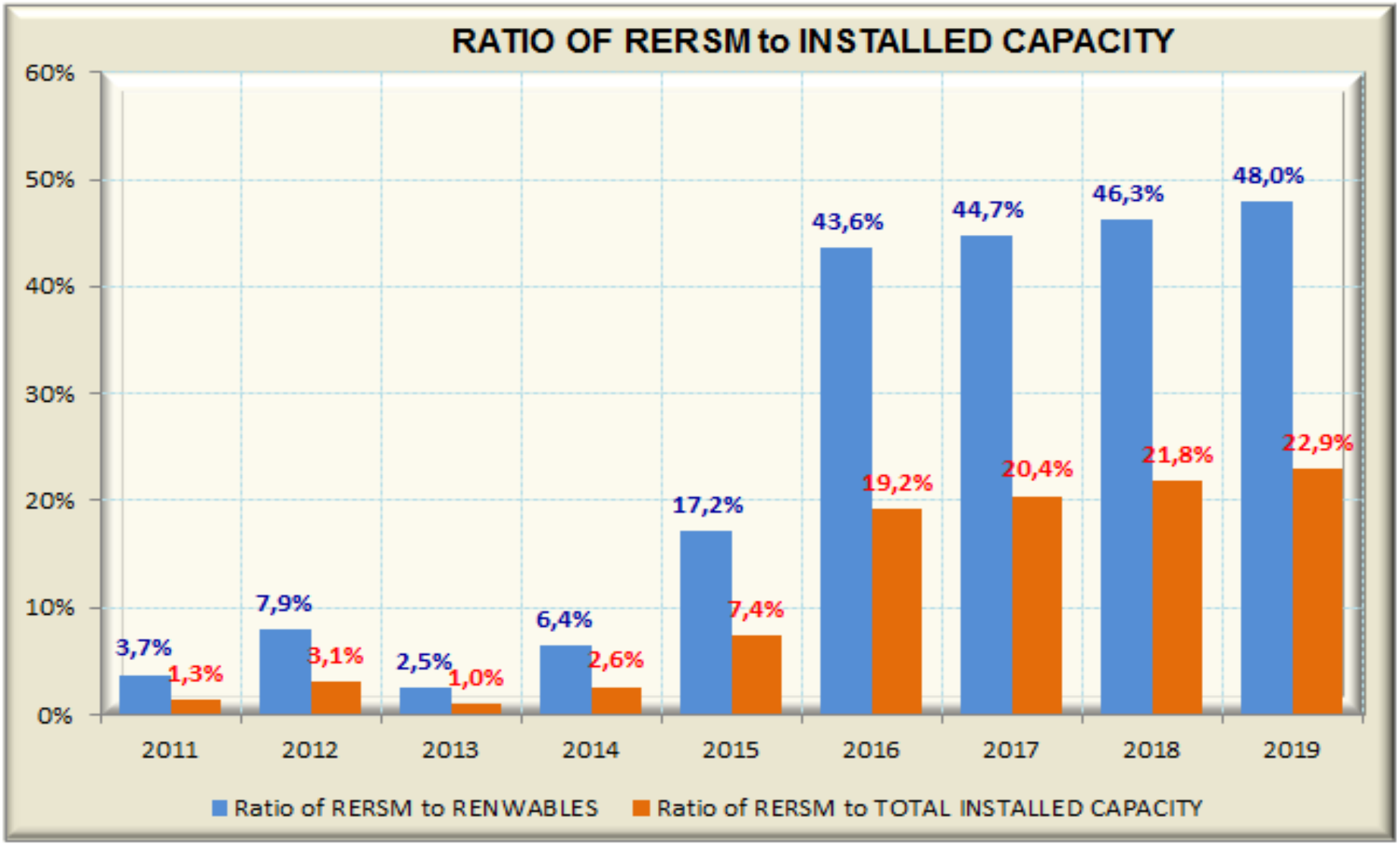
RERSM FIGURES

	RERSM GENERATION (GWh)	RERSM GENERATING CAPACITY (GWh)	RATIO of ACTUAL GENERATION TO GENERATING CAPACITY (%)
2011	170,9	3086,5	5,5
2012	5263,7	8869,5	59,3
2013	2370,9	2994,9	79,2
2014	5845,5	8717,2	67,1
2015	17609,6	24433,2	72,1
2016	42808,3	58978,9	72,6
2017	48922,9	69023,7	70,9
2018	62505,4	74225,1	84,2
2019	78676,6	81431,7	96,6

CHANGE OF RERSM GENERATING CAPACITY AND ACTUAL GENERATION



RERSM SHARE in TURKEY TOTAL INSTALLED CAPACITY AND in TOTAL RENEWABLE RESOURCE INSTALLED CAPACITY



Renewable Energy Resource Area (RERA) Solar PV (1000 MW)

RERA SOLAR 1 : Tender was made on 20.3.2017 for installing 1.000 MW solar capacity, allocation of suitable land, by giving purchasing guarantee with feed-in tariff for 15 years to build a solar PV panel factory for local manufacture

Awarded Company: Kalyon-Hanwha Group (6,99 $-cent/kWh)

Factory Capacity: 500 MW/year

Minimum Local Content %: 60% for the first 500 MW, 70% for consequent production

Target Date For Start Of Manufacture At Factory: Early 2022

Founding Research Development Center : Early 2022

Start of Generation Of Electricity At Solar Power Plant (SPP): Midst of 2023

Ground breaking ceremony of factory was done in Ankara on 21.12.2017. Pre-license for SPP that will be installed in Konya Karapınar was issued by EMRA.

RERA SOLAR 2 : Cancelled

MINI RERA : According to news on the press, plans are made to open 100 tender for each 10 MW and total 1.000 MW capacity, with 15 years duration contracts, construction period maximum 22 months after obtaining license minimum local content for module to be 60 % and efficiency minimum 18 %. Installing a factory is not a condition, sale prices will be offered by open discount method on electricity sale price for kWh and announcements to be made in early 2020 and to collect offers in April 2020. These plans were postponed before start due to global pandemics.

Renewable Energy Resource Area (RERA) Wind (1000 MW)

RERA WIND 1 Tender was made on 3.8.2017 for installing 1000 MW capacity by giving purchasing guarantee with feed-in tariff for 15 years to build a wind turbine factory for local manufacture.

Awarded Company: Kalyon-Türkerler-Siemens Consortium (3,48 $-cent/kWh)

Factory Capacity :150 wind turbines/year Local Content 65%

Target Date For Start Of Factory: October 2022

Target Date For Completion Of Full System : Early 2027

Siemens bought land for the plant in Aliağa Organized Industrial Zone. Pre-license application is made to EMRA and is under evaluation.

RERA WIND 2 : On May 2019, 4 separate tenders, each for 250 MW installed capacity were made with the condition that wind turbines that will be and used should have at leats 55 points local content score and to offer minimum sell price for the electricity to be generated. MENR signed contract with winners on March 2020. Winners are granted purchasing guarantee for 15 years.

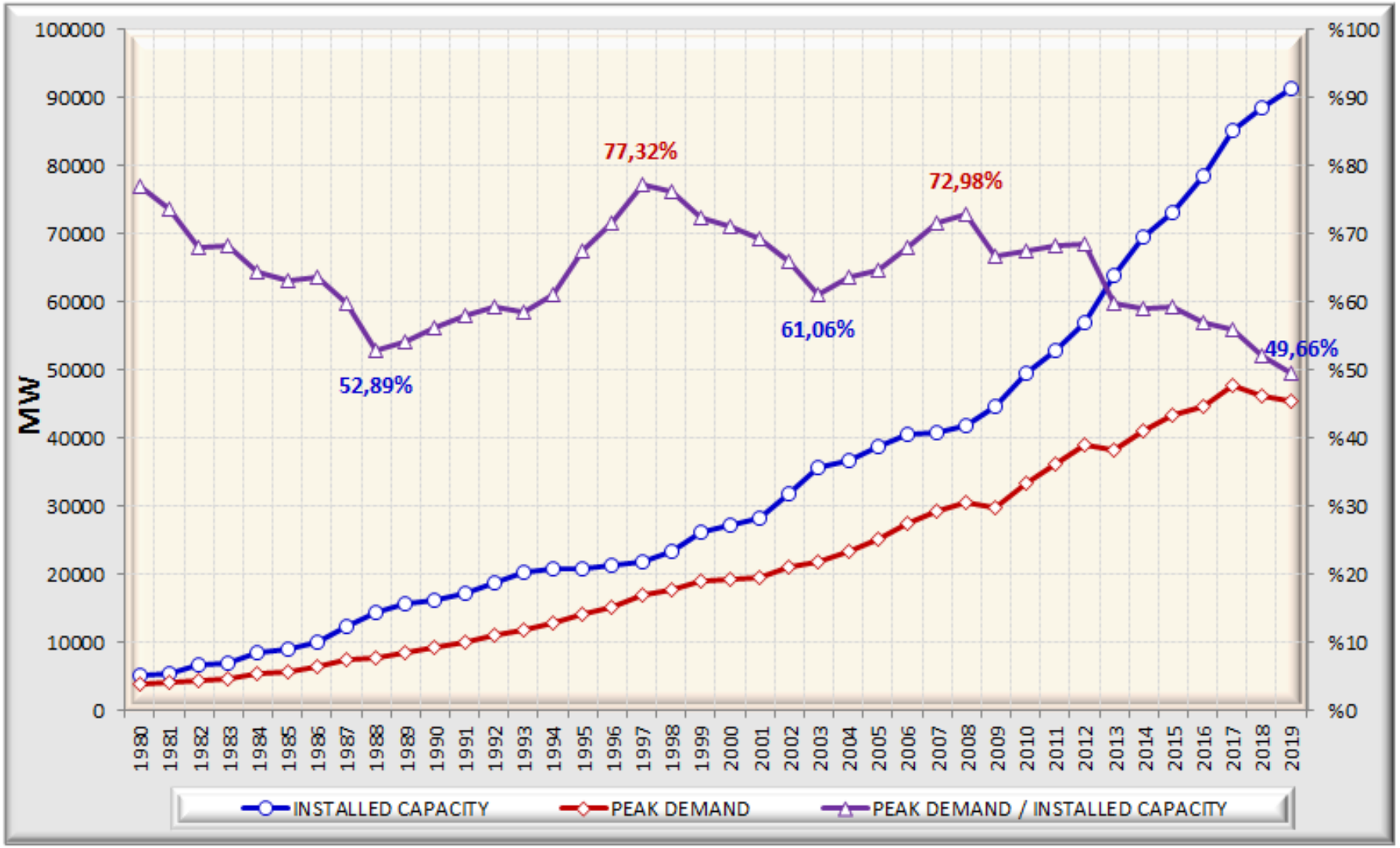
Enerjisa → For Aydın region 4,56 $-cent/ kWh,
for Çanakkale region 3,67 $-cent/ kWh

Enercon → For Muğla region 4,00 $-cent/kWh,
for Balıkesir region 3,53 $-cent /kWh

New RERA Contracts Will Be in Turkish Currency

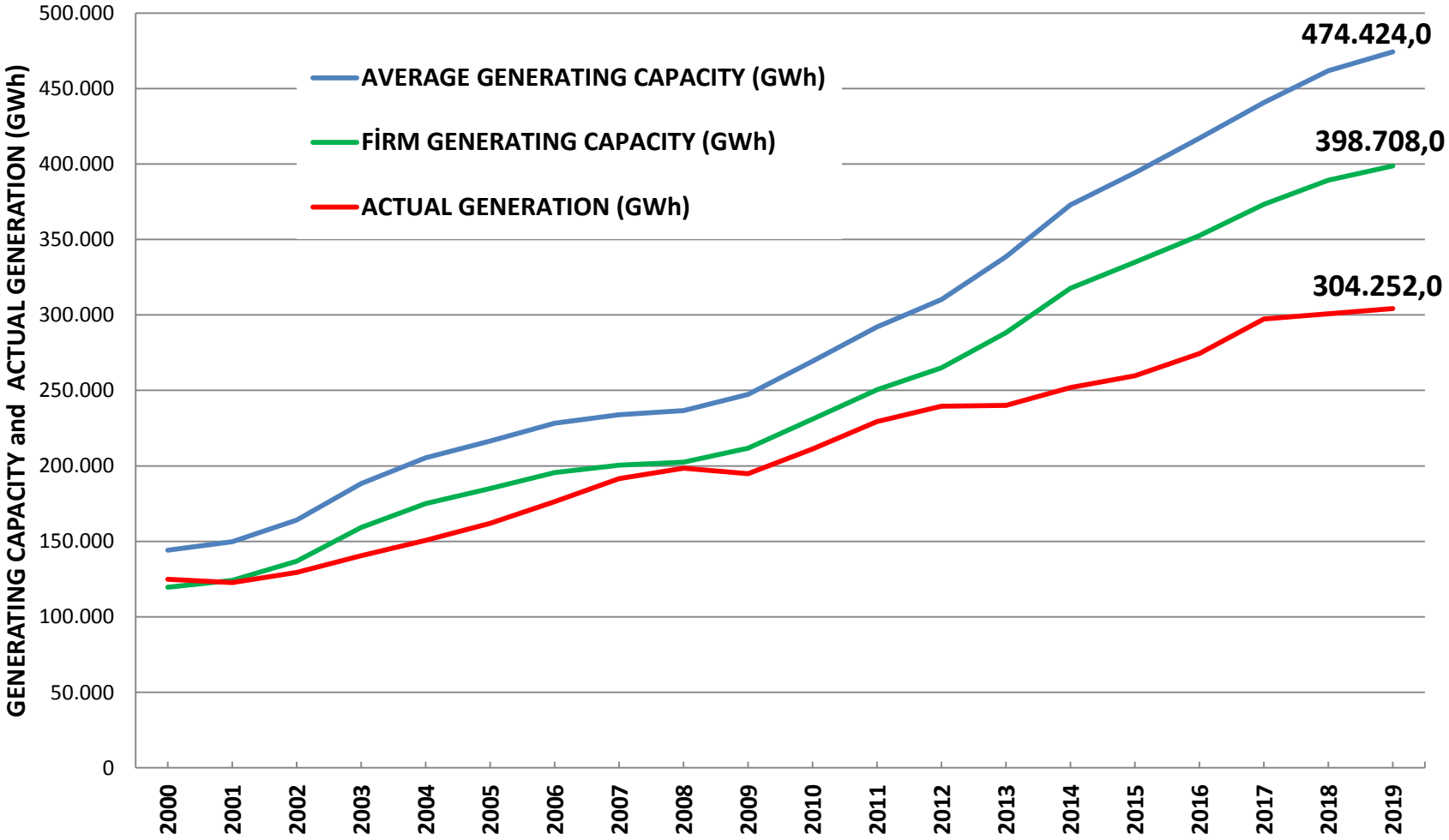
According to a change made in legislation on February 2020, in the new RERA tender, price offers for sale price of electricity to be generated will be discounted price cap decided by Ministry and awarded company offer price will be valid through the period defined in the tender docs in accordance with Renewable Energy Resources Support Mechanism.

Peak Demand Versus Installed Capacity 1980-2019



Source: TEİAŞ – According to Installed Capacity as of each year

Generating Capacity and Actual Generation 2000-2019



In 2019, although generating capacity increased by 4% compared to previous year, actual generation did not increase and stayed about the same. Capacity usage ratio declined.

Source: TEİAŞ

Annual Generating Capacity and Actual Electricity Generation, 2019

According to TEİAŞ 2019 temporary figures:

Installed Capacity = 91.267,0 MW
Total Actual Generation= 304.251,6 GWh

According to our computations of annual generating capacities based on TEIAS Projection Reports (*) :

2019 Average (Project) Generating Capacity : 474.424 GWh
Ratio of Actual Generation to Average Generating Gapacity : 64%

2019 Firm Generating Capacity : 398.708 GWh
Ratio of Actual Generation to Firm Generating Capacity:76%

(*): Average and Firm Generating Capacity are computed using fuel/resource data in TEİAŞ 2012-2021 Capacity Projection Report

Difference Between Installed Capacity and Peak Demand Needs to be Explained

- **2017**

  Installed Capacity: **85.200,0 MW**

  Peak Demand: **47.660 MW** (26.7.2017,14:40) **55,9 %**

- **2018**

  Installed Capacity: **88.550,8 MW**

  Peak Demand: **46.160 MW** (1.8.2018, 15.20) **52,1 %**

- **2019**

  Installed Capacity: **91.267,0 MW**

  Peak Demand: **45.324,4 MW** (26.8.018, 16.30) **49,7 %**

This and below points must be explained by energy management :

- Status of public power plants? Status of privatized coal power plants ?
- Firm capacity issue ?
- There is no problem on firm capacity issue, demand is behind generating capacity

Source: TEİAŞ

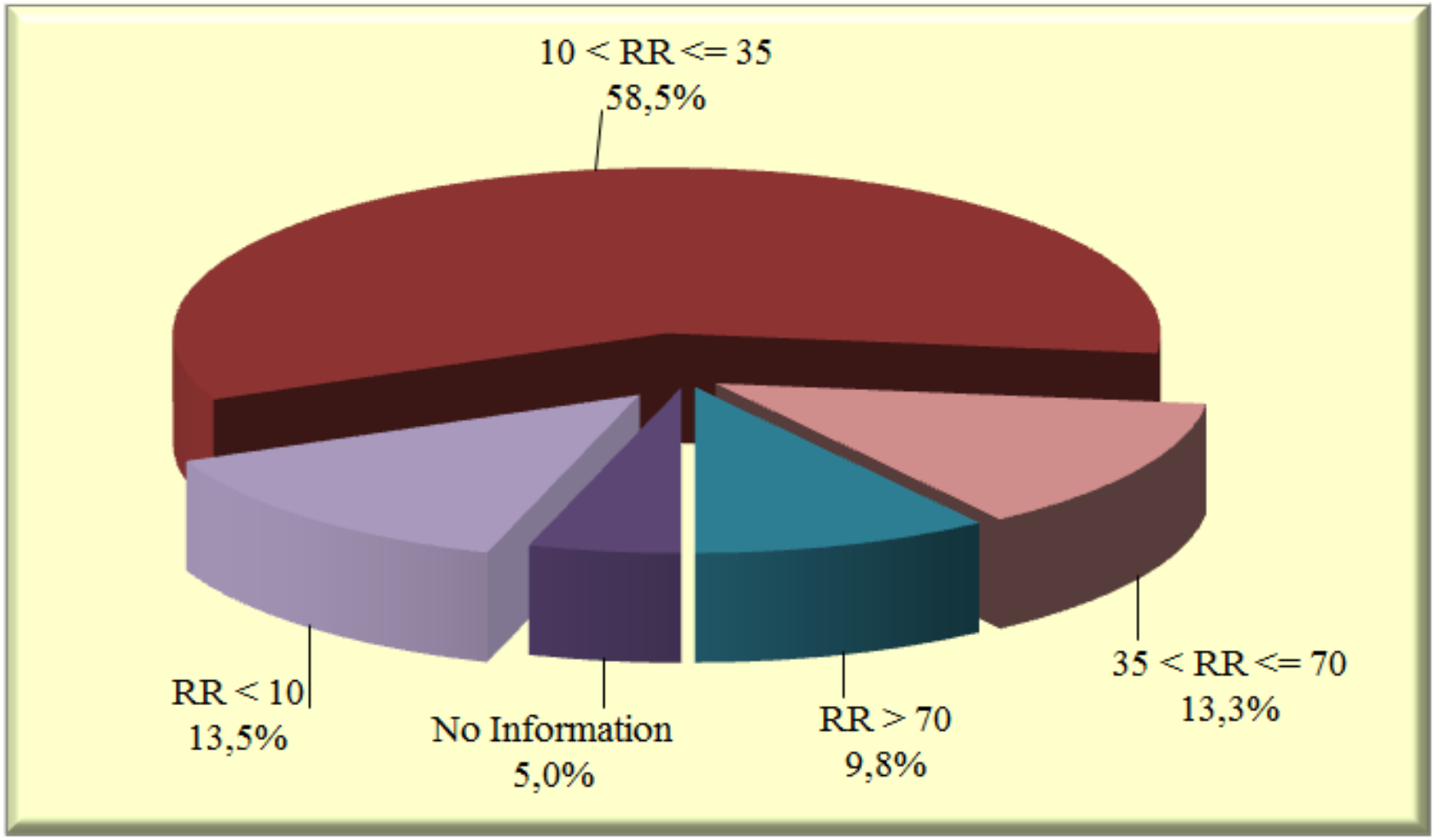
EMRA – Licensed Power Plants Investment Realization Rates Report, January 2020

Fuel /Resource	Licenced Capacity Under Construction (MWe) January 2020						
	No Information	RR < 10	10 < RR <= 35	35 < RR <= 70	RR > 70	Total	Share (%)
Biomass	123,0		44,9	75,3	75,1	318,3	1,4
Nanural Gas	6,5		3136,9	73,5	136,7	3353,7	14,4
Fuel-oil					9,2	9,2	0,0
Solar	5,0	24,6	8,0	17,0	15,0	69,7	0,3
Hydro	45,7	674,6	1258,8	249,1	1572,6	3800,8	16,3
Imported Coal		1320,0	1885,5	1320,0		4525,5	19,4
Geothermal		141,6		50,0	8,0	199,6	0,9
Coal				30,0		30,0	0,1
Wind	133,7	39,5	880,1	1245,3	452,8	2751,4	11,8
Uranium			4800,0			4800,0	20,6
Ashaltite		135,0				135,0	0,6
Domestic Coal	845,0	800,0	1600,0	36,0		3281,0	14,1
Grand Total	1158,9	3135,4	13614,1	3096,3	2269,5	**23274,2**	100,0
%	5,0	13,5	58,5	13,3	9,8	100,0	

RR : Realization Rate

Source: EMRA January 2020 – Realization Rates Report
http://www. http://epdk.gov.tr/Detay/Icerik/3-0-86/elektriklisans-islemleri

Realization Rates of Power Plant Projects Under Construction Licensed by EMRA (%)



Source: EMRA January 2020 – Realization Rates Report
http://www. http://epdk.gov.tr/Detay/Icerik/3-0-86/elektriklisans-islemleri

Pre-Licensed Projects

MW	Under Evaluation	Valid	Total
Hydro	62,7	3500,5	3563,3
Geothermal		385,1	385,1
Solar		1158,5	1158,5
Wind	1406,0	3632,6	5038,6
Biomass	161,4	819,7	981,1
RENEWABLE TOTAL	**1630,2**	**9496,3**	**11126,5**
Natural Gas	7,4	807,4	814,7
Imported Coal	350,0	2340,0	2690,0
Coal		55,0	55,0
Diesel			
Process Contaminan Heat			
Domestic Coal		519,8	519,8
Other			
THERMAL TOTAL	**357,4**	**3722,2**	**4079,6**
GRAND TOTAL	**1987,5**	**13218,5**	**15206,0**

Source: EMRA (http://www. http://lisans.epdk.org.tr/epvys-web/faces/pages/lisans/elektrikUretim/elektrikUretimOzetSorgula.xhtml

Installed Capacity of Existing Projects at Construction and Licensing Stages and Total Project Pipeline

Status	Installed Capacity (MW)
Power Plants (PP) In Operation as of End of December	91.267,00
PP at Construction Stage (Excluding Akkuyu NPP)	18.474,20
Operating Power Plants + PP at Construction as of January 2020 (Excluding Akkuyu NPP)	109.741,20
PP Projects Obtained Pre-License as of January 2020 (Excluding imported coal based PP with 2.340 MW installed capacity)	10.878,50
PP Projects Whose PreLicense Applications Are Being Evaluated as of January 2020 (Excluding imported coal based PP 350 MW installed capacity)	1.637,50
Projects From Renewable Energy Resource Area (RERA) Tender	1.000,00
Total Project Pipeline as of January 2020	123.257,20
2023 Target – Turkey Renewable Energy Action Plan (2014)	125.000
2023 Target - MENR 2019-2023 Strategy Plan (May 1, 2020)	110.000

Balloon In Power Plant Project Pipeline (1)

- Peak demand in 2019 was on 26.8.2019 with 45.324,4 MW which is less than half of installed capacity. In other words, installed capacity is twice of peak demand. Planning should be fundamental criterion for Turkey's national grid and the extra reserve margin between peak demand and installed capacity, in other words, how much more installed power should be more than peak demand should be by considering distribution of resources in generation, firm generating capacities of plants, availability and computed by considering system reliability. The results of such a study should be taken into account while ascertaining needs for new power plant decisions and waste of resources should be avoided.

Balloon in Power Plant Project Pipeline (2)

- In a country like Turkey where the economy is fragile and facing serious economic crises every seven or eight years, investors who do not bother with detailed computations and believe electricity prices will always stay at high levels, exchange rates will stay the same and the Turkish Lira will not loose value versus foreign currency, banks and bankers who do not search the knowledge, experience and management capacities of investors and even do not review feasibility of the projects for which bank finance is requested, assume that they are on safe side if the debtor provides secure guarantees, EMRA which rejects planning concept and applications and issues licenses to all power plant projects without questioning whether there is a need for such a plant and whether the plant increases external dependency, MENR which assumes that demand for electricity will increase linearly 6% per annum and prefer to be a silent viewer instead of intervening authority, all of these are joint and consecutive responsible for squander of resources and piling of an idle installed capacity.
- When new power plant projects being constructed now and at pre-construction stages will be added to existing installed capacity, the installed capacity will reach 130.000 MW and with this excess capacity, starting from old and costly lignite fired power plants, all unproductive old and financially weak power plants will close.

Steep Increase of Non Performing Loans in Energy Sector

- **Ms. Ebru Edin, Deputy General Manager of Garanti Bank, in a speech she made on 10. IICEC Energy Conference stated that in last 17 years, 110 Billion USD investment was made in energy in Turkey (90 Billion USD in generation, 20 Billion USD in distribution), banks supplied 70 Billion USD finance to these projects and 47 Billion USD portion of these credits including 7 Billion USD in distribution has not been paid. She also added that due to changing conditions, they will no longer finance power plants based on gas and coal.** https://yesilekonomi.com/komur-ve-dogal-gazi-istesek-de-finanse-edemeyecegiz/ The last access date: 25 February 2020
- **Non performing loans of energy sector which was 0,637 Billion TL at the end of 2017, increased 10 times and amounted to 6.322 Billion TL at the end of 2018, 21,675 times and amounted to 13.700 Billion at the end of 2019 and constitutes 6,6% of credits supplied to energy sector. Ümit Bilirgen of KPMG Turkey said that they expect consolidation procedures will accelerate in energy.** https://www.bloomberght.com/enerji-sektorunde-sirket-birlesme-sureclerinin-hizlanmasini-ongoruyoruz-2248855. The last access date: : 22 February 2020.
- **Some well informed sources claim that uncollectable loans will be first transferred to local asset management companies and then to international equity funds.**

Overview of Payments Made to Private Electricity Generation Companies

In Addition to Payments Made Per BO, BOT and TOR Contracts Which are About to Expire

PAYMENT METHOD	2018 PAYMENT TOTAL (TL)	2019 PAYMENT TOTAL (TL)
RESSM - RENEWABLE ENERGY RESOURCES SUPPORTING MECHANISM	26.171.450.587	38.036.854.434
CAPACITY MECHANISM (*)	1.407.116.257	2.000.000.000
ESTIMATED PAYMENT AMOUNT FOR PURCHASING ELECTRICITY FROM DOMESTIC COAL FIRED POWER PLANTS	4.800.000.000	7.100.000.000
TOTAL	32.378.566.844	47.136.854.434

Beside above mentioned impacts, 15 years purchasing guarantee with 12,35 $cent/kWh average price for Akkuyu Nuclear Power Plant and 20 years purchasing guarantee with 10,83 $cent/kWh (excluding fuel cost) price for Sinop Nuclear Power Plant will cause negative effect on electricity consumer sale price and so on all sectors.

(*) Source for payment amount : EMRA

(**) Payment amount estimation has been calculated by using some assumptions.

Payments to Power Plants According to Feed-in Tariffs of RERSM and Over Market Price

- According to EPİAŞ data, average Market Clearing Price for electricity was 231,64 TL/MWh in 2018. In 2018, approximately 62.505.400 MWh electricity has been generated within RERSM Scheme:
  - Payment total is 26,17 Billion TL
  - Amount computed per market price total is 14,48 Billion TL
  - Extra payment over market price total is 11,69 Billion TL

- In 2019 average Market Clearing Price for electricity was 260,32 TL/MWh. In 2019, for 78.676.600 MWh electricity has been generated within RERSM Scheme:
  - Payment total is 38,04 Billion TL
  - Amount computed per market price total is 20,48 Billion TL
  - Extra payment over market price total is 17,56 Billion TL

Payments Made per Resource Types in 2018 and 2019 Within Electricity Market Capacity Mechanism

	2018			2019			TOPLAM
	NUMBER OF POWER PLANTS	INSTALLED POWER (MW)	PAYMENTS (Million TL)	NUMBER OF POWER PLANTS	INSTALLED POWER (MW)	PAYMENTS (Million TL)	PAYMENTS (Million TL)
NATURAL GAS	12	9.632	718,3	12	9.688	662,7	1.381,0
COAL (IMPORTED & LOCAL MIX)	3	4.515	34,1	2 (**)	3.195	18,7	52,8
COAL (LOCAL) (*)	14	6.583	654,8	15	6.583	1.183,6	1.838,4
HYDRO	---	----	----	10	1.674	135,0	135,0
TOTAL	28	20.730	1.407,1	43	21.140	2.000,0	3.407,1

(*) 9 of them privatized plants

(**) 6 plants were registered to Electricity Market Capacity Mechanism but only 2 of them burned mixture of imported and local coal

Source: EMRA

Fixed Price Purchase Guarantee For Electricity Generated in PP's Using Domestic Coal

	Septem-Dec. 2016	2017	2018	2019
PURCAHASED (GWh)	6.000	18.000	20.815	24.004
PURCHASE PRICE (TL/MWh)	185	185	201,35 + Escalation	285 + Escalation

It may be assumed that all purchases per Fixed Price Purchase Guarantee Scheme, are made in time intervals when Market Clearing Price is below guaranteed Fixed Price. Information given in below Table is based on this assumption.

FUEL / SOURCE	ESTIMATED PAYMENTS (Million TL)			
	Septem.-Decem. 2016	2017	2018	2019
COAL (IMPORTED AND LOCAL MIX)	------	------	42	76
COAL (LOCAL)	300	800	958	2.024
TOTAL	300	800	1.000	2.100

Another Promotion to Power Plants Using Local Coal

To private companies who buy privatized power plants or install new power plants using domestic coal, extra 3% premium is paid in addition to guaranteed buying prices in case of obtaining Environmental Permission for operation.

This is very controversial. Those power plants who have not completed all investments to minimize negative environmental impacts should not be permitted to operate. However, they are allowed to operate despite their deficiencies and moreover given a bonus for fulfilling the requirements which is a must for operation.

The Right(!) Provided to Power Plants Using Local Coal to Postpone Investments to Minimize Negative Effects to Environment (1)

- Companies who bought power plants using local coal within privatization program during 2013-2015, had committed to complete all investments in the power plant to minimize negative effects to environment in two years. As they did not fulfill their commitments, with a very arguable legislation change, this two years were extended till the end of 2019.
- Some companies did not even bother themselves at all and used this extra time period for "using the right to pollute the environment"
- Just before this period expires, with a legislation change this period was extended for another two and half years (till 30.6.2022). This change was vetoed by President.

The Right(!) Provided to Power Plants Using Local Coal to Postpone Investments to Minimize Negative Effects to Environment (2)

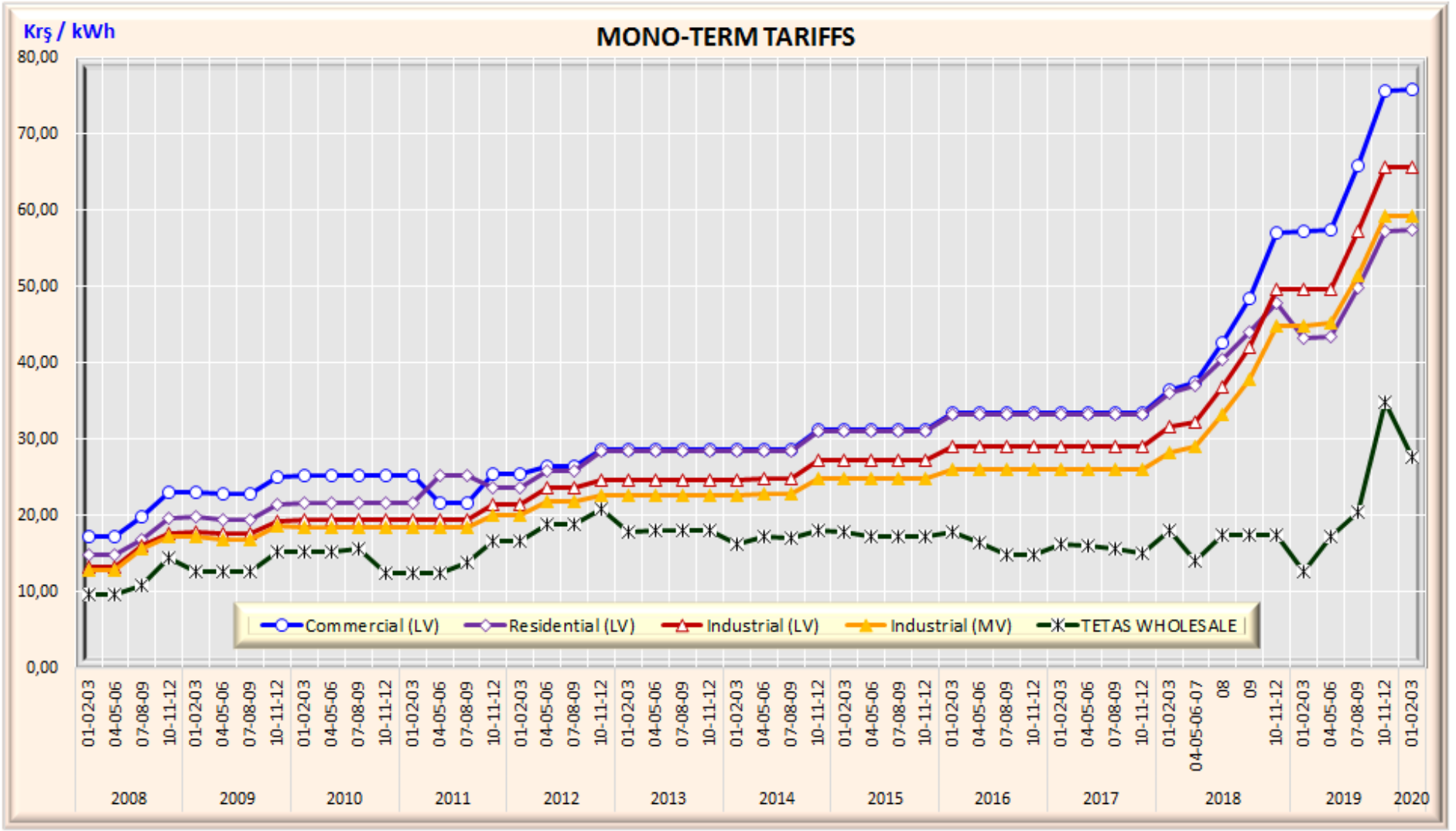
- *Ministry of Environment and Urbanization* (MEU) and *Ministry of Energy and Natural Resources* (MENR) declared a joint decision and ceased operation of a few power plants temporarily for six months and said they will see the investments to be made to decrease negative environment effects. A vicious play was on the scene. Although it was very well known that the lignite based power plants which were permitted to operate had also very serious shortcomings, authorities neglected this and granted them the opportunity to pollute society and nature. Moreover in June 2020, the power plants whose operations were stopped temporarily were permitted to restart operation as if the required investments have been fully concluded which was not the reality. Only "duct sorbent injection system" has been installed in these plants to reduce sulphur dioxide emissions in the flue gas. Duct sorbent injection system was never preferred in Turkey because of high sulphur and ash content of local coals, this system would not be sufficient to reduce emissions to limit values stated in environmental legislation and/or such systems may not function properly and service continuously at long term operation conditions. Moreover, no improvement is made for dust and nitrogen oxide emissions and ash management. *Chamber of Mechanical Engineers* (CME) has been asking all relevant public authorities to act for protection of the right to live in a clean environment and not look after profits of a few private companies. All thermal power plants (coal, gas, geothermal) should be controlled and checked whether their operations comply fully to environmental legislations and results of audits should be transparent and accessible by citizens and society.

Overview of Extra Payments Made to Private Power Generation Comp. and Extra Priveleges

Excluding BO, BOT, TOR Contracts Which Are Expiring

	2018 PAYMENTS (TL)	2019 PAYMENTS (TL)
PAYMENTS MADE OVER MARKET PRICE PER RERSM (Computed By Us With Certain Assumptions)	11.692.240.000	17.555.760.000
PAYMENTS MADE OVER MARKET PRICE TO LOCAL COAL-FIRED POWER PLANTS AND PROVIDED SPECIAL PRICES (Computed By Us With Certain Assumptions)	1.000.000.000	2.100.000.000
CAPACITY MECHANISM PAYMENTS (EMRA - TEİAŞ)	1.407.116.257	2.000.000.000
FUEL PRICE SUPPORT TO GAS-FIRED POWER PLANTS (Computed By Us With Certain Assumptions)	4.130.000.000	1.520.000.000
EXTRA PREMIUM TO LOCAL COAL-FIRED POWER PLANTS WICH HAS ENVIRONMENTAL PERMISSION (valid from 2019)	------	?
FLEXIBLE DECISIONS TO PRIVATIZED COAL-FIRED POWER PLANTS WHICH DO NOT MEET ENVIRONMENTAL REQUIREMENTS "Right to pollute environment"	?	?
TOPLAM	18.229.356.257	23.175.760.000

Electricity Sales Tariffs
2008-2020 January-March



LV: Low Voltage **MV** : Medium Voltage

Source: http://epdk.org.tr/TR/Dokumanlar/TDB/Elektrik

Energy Support to Poor People

Energy poverty problem is getting more serious in Turkey. 36,64 percent of total employees are working outside of social security system and about 60% is working with minimum wages. Price increase of electricity and gas increase the heavy burden of the families.

Minister of Energy and Natural Resources, in a reply to a question posed in parliament stated that in first 9 months of 2019, due to their overdue invoices, service was stopped for 3.365.784 electricity and 710.364 gas subscribers. During January 2018 and 2020, electricity and gas prices increased well over the increase in minimum wage. As of April, average electricity, gas and water billions of a household totaled up to 15,90% of minimum wage in İstanbul and 16,75 in Ankara. Due to sanctions applied to overcome Corona virus pandemia, millions of people lost their jobs and hundreds of thousands small enterprises were closed down and these people were not able to pay their electricity, gas, water, phone, internet bills. These masses will be subject to compulsory execution of gas and electricity companies and energy poverty problem will be faced by man more millions of people. In order to stop this, public support should be given to people whose living conditions worsened with corona virus crisis which is now tangled with economic crisis and gas, electricity, water, internet, phone bills of poor people should be paid by state.

Increase in Certain Indexes Between January 2018 - January 2020

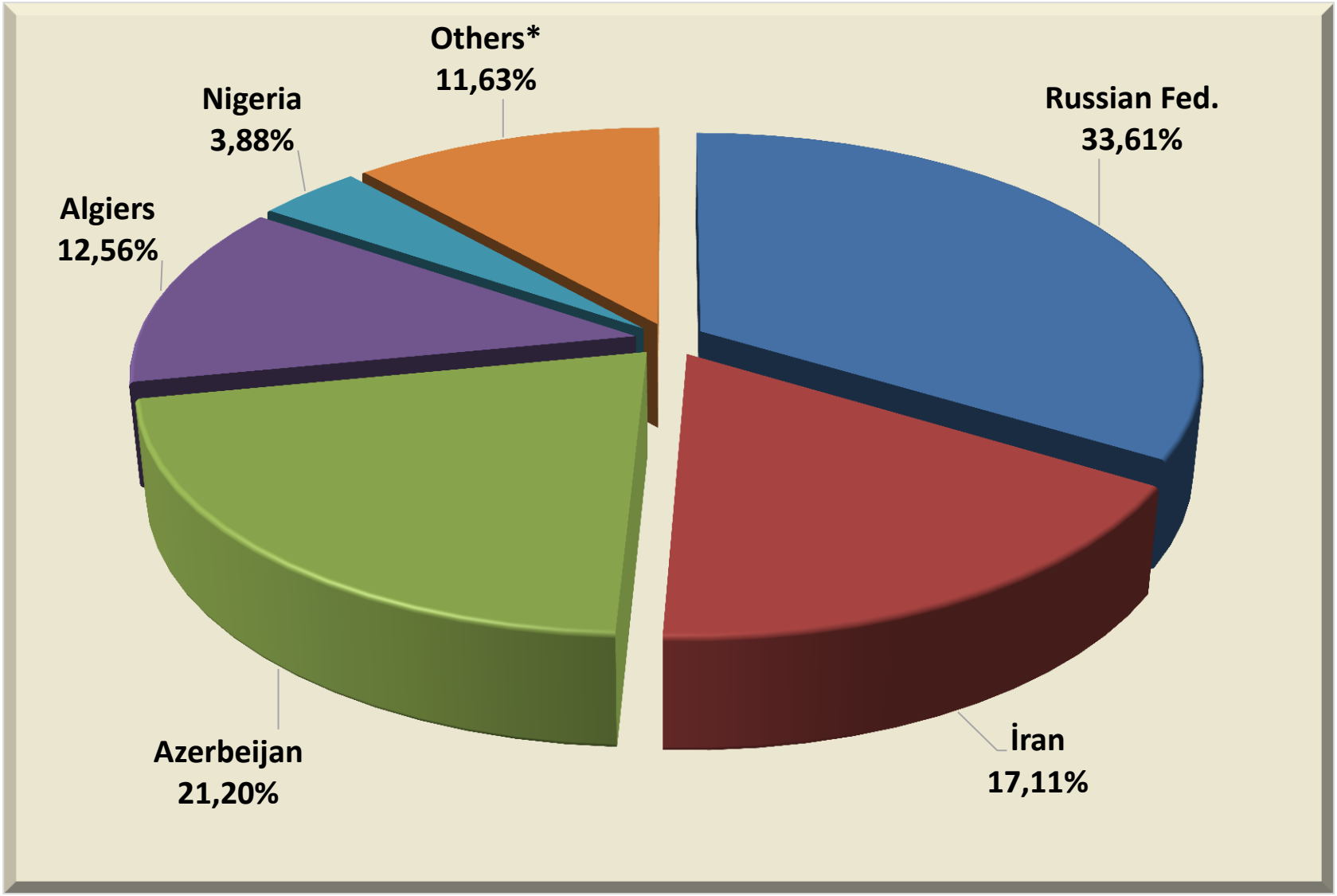
Index	Increase During January 2018 - January 2019 (%)	Increase During January 2019- January 2020 (%)	Increase During January 2018 – January 2020 (%)
Inflation Rate of Turkey Statistics Corporation	20,35	11,84	34,80
Ministry Of Finance Re Evaluation Ratio For Tax.	23,73	22,58	52,67
Minimum Wage*	26,00	15,00	44,90
Elec. Sell Price For Houses	19,92	32,13	57,92
Istanbul N. Gas Sell Price For Houses	20,35	32,35	59,28
Ankara N. Gas Sell Price For Houses	21,19	31,47	59,93

* Minimum wage for a worker with unemployed wife and two children

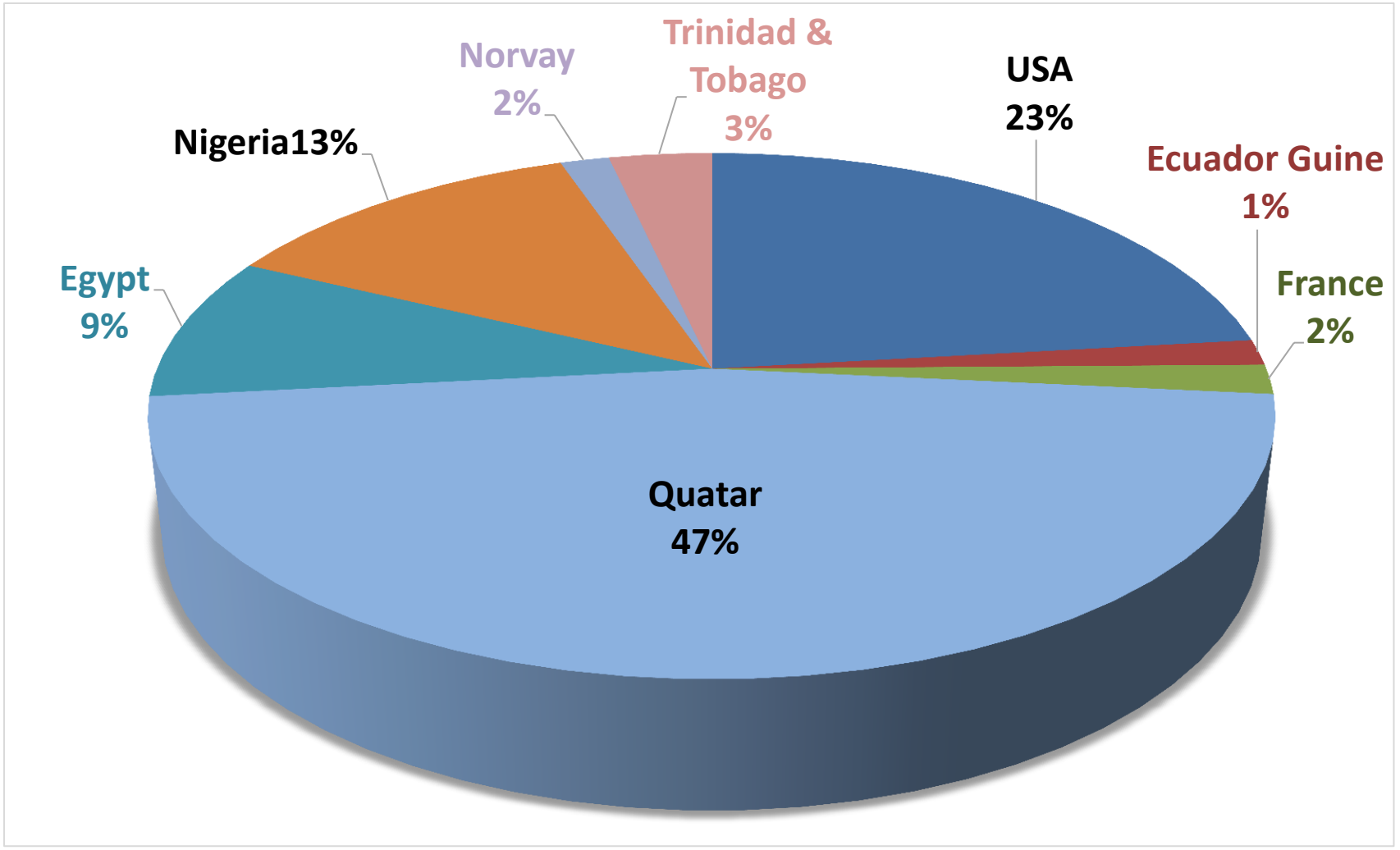
Dependency on Imports and Price Issues in Natural Gas (1)

- Natural gas holds the second place in primary energy supply with 28,65% after oil in 2018. More than 99% of gas used in Turkey is imported and used as a primary energy source for power generation, industrial production and household needs. Natural gas transmission grid has covered all of Turkey and gas is distributed to all of 81 provinces. Association of city gas distribution companies, GAZBİR states that number of house subscribers reached 15.871.965, eligible customers reached 629.887 totaling up to 16.501.85.
- Import of natural gas increased by 47,9% during 2008-2017. However, in 2018 due to high price increase of gas and worsening economic conditions, demand for gas declined. Decline trend continued in 2019 and gas import which was 50,282 billion m^3 decreased by %10,1 and was 45,207 billion m^3 in 2019.
- In 2017, share of natural gas-fired power plants provided 36,6 % of power generation. This share retreated to 30,09 % in 2018 and 18,6% in 2019.
- According to EMRA data, natural gas consumption which was 48,793 billion m^3 decreased by 8,2% and was 44,794 billion m^3 in 2019. EMRA forecast of 52,133 billion m^3 for 2019 was not realized. Despite this 14,1% deviation, EMRA insisted on its arguable expectations for steep increase in gas demand and announced forecast for 2020 was 52,019 billion m^3.
- Russian Federation who once provided more than 60% of gas imports of Turkey is still the biggest supplier although now its share is diminishing.

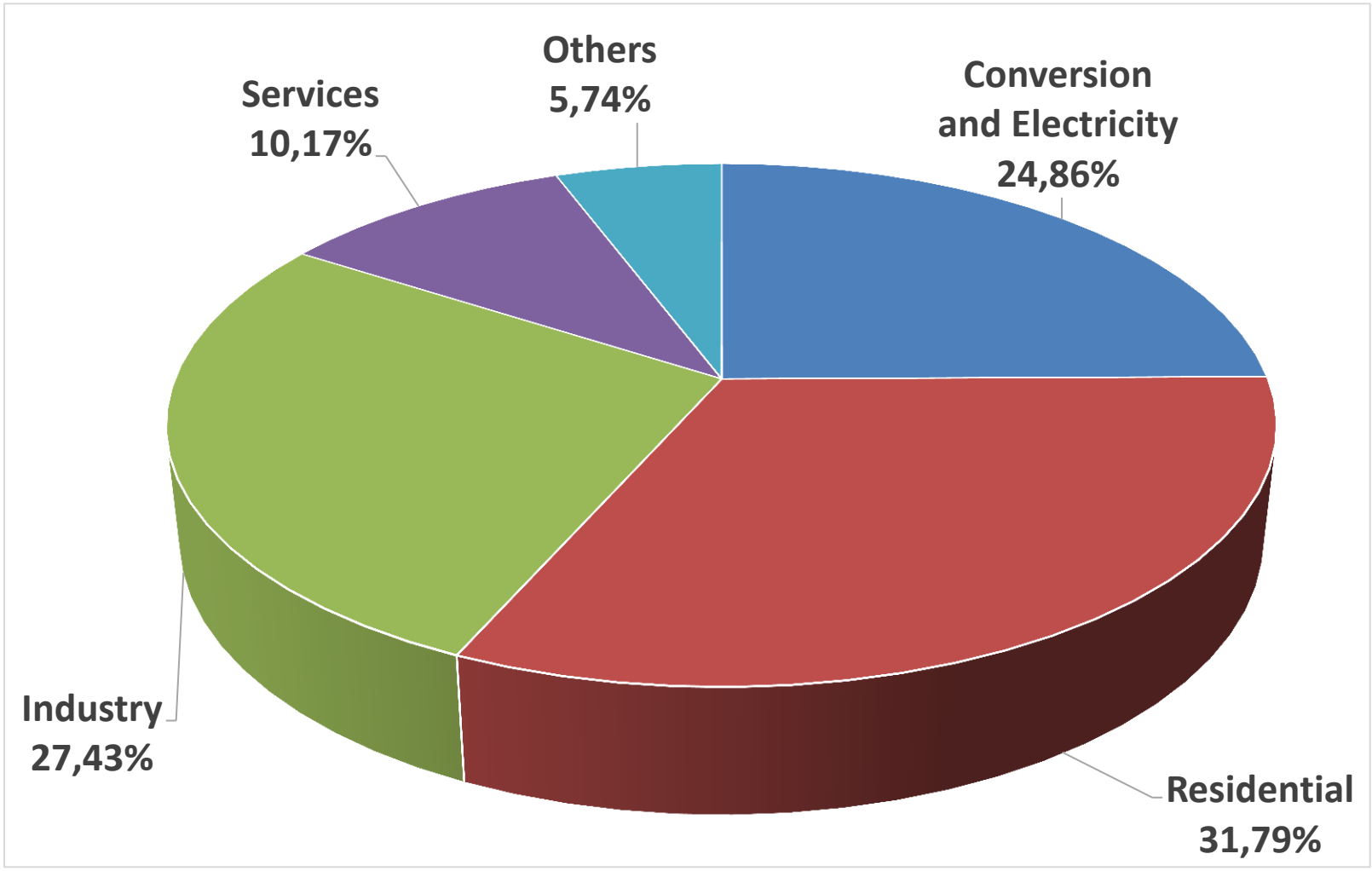
Sources of Turkey Gas Import in 2019 and Their Shares



Sources of Turkey LNG Import in 2019 and Their Shares



Natural Gas Consumption by Consumer Sectors



Policies

- In order to control price increases, it is necessary to diversify resources which can supply gas at reasonable prices, to re-discuss existing contracts, get significant discounts from very high buying prices, discard articles against country welfare and increase local production.
- There is a clear need to concentrate in local exploration and production and increase local gas production. In addition to on-shore activities, off-shore exploration activities must be accelerated. Ambitious targets stated in MENR Strategic Plan for 2019-2023 such as to increase 3-D seismic studies by 7,6 times, double local oil production, increase gas production by 15 times, to drill 22 new wells with unconventional methods can be realistic only if there is planning and applicable action plans.

Offshore Gas & Oil Exploration

Turkey has declared Exclusive Economic Zone in Black Sea alignment with mutual understanding of all countries surrounding Black Sea with decree dated 05.12.1986 and no 86-11264. Similar activities for Aegean Sea and Mediterranean was not made and bold reaction was not shown when these seas were subdivided by Greece, Egypt, Greek Part of Southern Cyprus. Greek Cypriots and Greece policies supported by EU are inclined to disregard Turkey's rights and neglect the fact that Turkey is the country with longest shore in Mediterranean and try to force in Turkey to accept to fit in shore line and small bays. No country has the authority to annul Turkey's rights.

Turkey should increase diplomatic contacts and at the same time continue exploration activities.

Need For a New Public Entity in Oil&Gas (1)

- Inseparable integrity of oil and gas due to their structural characteristics, and continuity of rings in exploration and production, transmission and reaching ultimate consumer must be considered and like in many other countries of the world, in our country also, oil and gas exploration, production, refining transmission activities should be carried in a vertical integrated structure and this entity could be capable of providing distribution and sales activities if required.
- For this purpose, a new entity namely Turkey Petroleum And Gas Corporation which will include TPAO and BOTAŞ should be formed. This Corporation should be capable of providing :
  - On shore and off-shore exploration and production activities and ancillary technical services,
  - Installing and operating oil and gas transmission lines,
  - Installing and operating oil refineries,
  - Engineering and consultancy services,
  - Research & Development ,
  - Trade, import, export , wholesale and distribution,
  - Installing and operating LNG terminals,
  - Installing and operating under ground gas storage facilities,
  - Installing and operating oil storage facilities

Need For a New Public Entity in Oil&Gas (2)

In all seas where Turkey has sovereign rights, within a plan that will take into account all previously made studies and surveys as well as surveys and explorations made by other countries/companies in nearby regions, first regions that will have priority will be defined. 2D and 3D surveys should be made in cooperation between MTA and TPAO and noting the results of these surveys, target drill locations should be specified. TPAO'S Offshore Operations Department should be strengthened by employment of enough numbered qualified staff. By this means, said Department will manage to operate 3 drill ships, one seismic survey ship and three support ships which is a significant size. Naturally, this fleet and Department should continue their activities within the company that will be formed by BOTAS and TPAO.

Some Remarks About Nuclear Power Plant Projects in Turkey (1)

- As explained earlier, there is an existing surplus capacity far over required capacity and a project pipeline that will cope with the requirements in coming ten to fifteen years. If energy is used more efficiently and if savings that total up to 30% in ultimate sectors are made, this will create a very significant extra supply.
- If periodic maintenance, repair and rehabilitation works are done regularly and by applying a planned energy management in power plants, it is possible to attain an extra power generation capacity more than one fourth of power generated last year. If there would be a very extraordinary demand which cannot be met with all these policies, then the renewable sources such as wind power and solar energy waiting to be utilized can be evaluated.
- Turkey does not have nuclear energy strategy document, road map and action plan but has a law for nuclear power plants. There is no social welfare in Akkuyu and other NPP projects and there is no need for NPP:
- Waste of NPP is a very serious problem with no solution. NPP also have other serious risks starting with earthquakes .
- Feed In Tariff prices are very high and are about 2,5 times of market prices.

Some Remarks About Nuclear Power Plant Projects in Turkey (2)

- Akkuyu NPP and planned others are dependent on foreign countries and companies in terms of fuel, technology, operation and ownership.
- Despite the fact that there is no National Nuclear Energy Strategy and, Action Plan, there is intention or will of political power to prepare them. Fundamental legislations for peaceful use of nuclear technology and secondary legislations have shortcomings. Noting all these facts, energy managements' attempts to targets such as start power generation in first reactor of Akkuyu NPP Project to start construction of Sinop NPP, to finalize preparations of third NPP do not comply with the welfare of society and country. In Akkuyu NPP Project all decision making authority is transferred to Russian firm, armoring a commercial contract between two companies by getting it ratified by parliaments and converting to an international agreement and trying to get the NPP outside the control of national judiciary system and converting the country to a free test area for nuclear energy is unacceptable.
- Energy projects in general, NPP projects in specific should not be the subject of inaccessible secret discussions and carried behind high walls and closed doors. All procedures, meetings, discussions and complete decision making should be clear, open and accessible.

- **WE MUST BRING FAULTY ENERGY POLICIES TO AN END, PROPOSE AND APPLY A NEW PARADIGM AND ROAD MAP**
- **OUR REQUESTS**
- **OUR PROPOSALS**

End to Faulty Energy Policies! Public Services Should be Provided by Public Organizations (1)

- It is clear that it is not possible to overcome the world-wide crises which has deepened and whose destructive effects have increased by applying existing capitalist and neoliberal policies.
- In order to solve the problem; it is compulsory to follow social programs and policies that will have a planning and social development perspective based on public ownership, public service and social welfare aiming to meet essential needs of citizens and society. In this context, it is required to shift energy sector from profit hegemony of private monopolies to a public sphere, to move to a low carbon economy based on public planning and renewable energy sources, aiming social welfare and use energy with maximum efficiency and implement a democratic control/program.
- We should first imagine democratic energy policies and programs. No one can chain up our dreams. Then we have to work hard for design, building, developing and applying and converting to reality.

End to Faulty Energy Policies! Public Services Should be Provided by Public Organizations (2)

- Democratic energy program is aiming to change neoliberal policies which have abolished labors' historical achievements, organizational capabilities and social state for the benefit of capital and converted all public services including education and health to market activities. It is an inseparable part of a political, economic, social democratization program which considers labor as the most important value and struggle for building an equal, free, righteous and lawful society and independent and democratic country.
- NOW IT IS THE TIME TO BRING AN END TO PRIVATIZATION POLICIES AND PLAN AND APPLY PROGRAMS, POLICIES, PROGRAMS, CORPORATIONS, RE-STRUCTURING AIMING TO PROVIDE PUBLIC SERVICES SUCH AS ENERGY, HEALTH, EDUCATION BY PUBLIC ENTITIES ACCORDING TO PUBLIC PLANNING PRINCIPLES.

Why Public Services Such as Energy Should be Provided by Public Entities ?

PUBLIC ENTITIES

1. Do not have a profit expectation. They aim to meet energy requirements not from the standpoint of an individual company's benefits but from the standpoint of generating and distributing energy and protecting social public and national welfare and allowing wide masses to use energy at low cost and continuously.
2. Do not look after profit based generation and aim to continue generation to meet the needs of society even when it is not profitable.
3. In order to meet energy demand instead of permitting unplanned private investments which increase dependency imported sources, policies aiming to minimize losses in distribution and transmission and benefit from savings that can climb up to 50% in some sectors with using energy efficiently are used.
4. Concentrate on projects that will create room for using local made energy equipment and based on renewable resources and consequently increase employment, decrease dependency on imported resources, generate electricity with low cost and support local industry by using local made energy equipment.

Cornerstones of Energy Strategy (1)

Our strategy for energy sector is based on below corner stones:

1. To review growth policies, adopt a development policy based on equitable income sharing and developing social rights and to leave policies and activities which neglects basic sciences, developing technology and quality production and dependent on imported products and dealing with low or medium technology industries.
2. Transition to a new low carbon energy policy with minimum adverse effects to climate crisis and based on more efficient use of energy and thus decrease the demand by the savings gained and plan and realize new generation facilities with renewable sources and local manufactured energy equipment.
3. Transition in industrial policies which will prioritize low energy consuming, based on high technology industries such as electronics, computer hardware and software, robotics, avionics, laser, telecommunication, genetics, nano-technologies and leave old, high energy consuming, environment pollutant industries such as cement, ceramics, arc furnace steel mills, textile.

Cornerstones of Energy Strategy (2)

4. To create an awareness for using energy more efficiently and stay away from all use of applications and events where energy is wasted meaninglessly.
5. Control, rehabilitate, renew infrastructure of generation, transmission, distribution systems.
6. Since energy policies are related and connected to industry, agriculture, transport, tourism, urban life and most important national security policies and foreign affairs, re-arranging energy policies noting all these macro tendencies and according to public planning, public service and social welfare criterion and principles.

What Should End, What Should be Done (1)

- In Akkuyu NPP, TANAP, Turkish Stream and similar projects all decision-making authority is transferred to foreign firm, armoring a commercial contract between two companies by getting it ratified by parliaments and converting to an international agreement and trying to get the project outside the control of national judiciary system is unacceptable. Such contracts should be rediscussed and all articles against Turkey's benefits should be discarded.
- Energy projects should not be the subject of inaccessible secret discussions behind high walls and closed doors. All procedures, meetings, discussions and complete decision making should be clear, open and accessible.
- Legal act named urgent expropriation which forces people to leave their homes and lands for energy investments and which is against human rights should end right away.
- All procedures and legislation which obstruct people's rights for applying to courts and file claims should be changed, simplified and made inexpensive so that people can defend their rights.

What Should End, What Should be Done (2)

- Unfair support mechanisms such as buying generated power at local lignite-based power plants with preferential prices over market price and capacity mechanism which allows serious extra payments to fossil fuel-based power plants should be terminated. High subsidies provided to power plants based on renewable resources has also served as a channel for transferring public sources to big private companies and should also end. Supports and subsidies should be limited to small plants which really need support.
- Activities of all power plants which have serious adverse effects to natural environment and social life should be stopped without any delay.
- Claiming that they are making an environment friendly power plant investment does not give the right to investors to harm the rights of people living in the environs, to occupy agricultural land and forests, to change direction and flow of creeps.

What Should End, What Should be Done (3)

- Environmental impact analysis of projects should not only focus on the effects of particular project being reviewed and also consider cumulative effects with similar and/or interacting projects nearby and in the same region. Construction and operation stages should be continuously controlled, audited and whether the commitments made by investors are fulfilled must be checked.
- Exceptions overrule rules. Public management is liable and responsible for full application of rules and defending constitutional rights of people and not looking for excuses and exceptions. Elected and nominated public administration directors essential task is to work for the rights of people, society, nature and country and not the benefits of power plant investors.
- In all energy projects, starting from site selection to feasibility study, plant erection and lifetime operation, welfare of society and environment should be considered and informing, dialog and acceptance of people must be realized. To install energy facilities to productive agricultural lands and to harm agricultural areas should not be permitted. The authorities should try to talk and understand why people oppose and protest some projects instead of threatening them and trying to silence them by force.

What Should End, What Should be Done (4)

- No coal power plant investment should be permitted unless there is clear social welfare. Operating plants and new ones being constructed should not be permitted to pollute the environment by fake legal applications. Social rights of miners and workers in coal power plants & mines must be protected and guaranteed and then operation of those plants which continue polluting and messing up should be stopped. Coal-fired plants must realize $DeSO_X$, $DeNO_X$, waste water treatment, waste ash stock area and similar necessary and compulsory investments very rapidly and unless they finish, commission and operate these systems efficiently and declare the emission figures continuously and simultaneously, they should not be permitted to operate.

Restructuring Energy Sector and Establishing New Organizations (1)

In lieu of so called market-based system, we are proposing planning discipline and mechanisms and as there will be no need for a market regulator in the scheme we propose, Energy Market Regulatory Authority will have to be closed down. Ministry of Energy and Natural Resources (MENR) is responsible for carrying planning activities in cooperation with Turkey Planning Corporation (TPC) proposed and below mentioned. MENR should be reorganized so that it can do required regulation, auditing, investment, generation activities in all segments of energy.

Turkey Planning Corporation (TPC) should be formed and its operation should be based on the following principles:

- Aim the integrity of the country and welfare of society
- Accept the fact that the conditions, specific needs and requests of local communities can be defined and determined at local sites better than the capital of the country,
- Consider growth with employment and fair distribution while heading for equal, free, righteous and lawful society and a prosperous country
- Target to solve the inequality between the regions and citizens in the society

Restructuring Energy Sector and Establishing New Organizations (2)

Target industrial development based on basic sciences, technology development and quality production and a growth policy .

Provide public services such as education, health, transport, housing by public organizations.

As an essential element of new public restructuring necessary for abovesaid activities, *Turkey Planning Corporation (TPC)* must be established. All around the country, at provincial level, Province Planning Departments and Province Planning Boards where municipalities and local divisions of state corporations and ministries are represented must also be established. Also Province Planning Advisory Boards where labor and professional organizations, universities and consumer organizations as well as the members of Province Planning Board are represented must be found. Similarly, in Ankara Turkey Planning Advisory Board should be set up and must be operative.

TPC and MENR should benefit from the synergy of country vise wide and democratic participation and with integrated resource planning approach, short, medium and long term strategy documents, five year plans, road maps, action plans should be prepared and applied.

Restructuring Energy Sector and Establishing New Organizations (3)

Based on wide democratic participation and the right to express critical views in its platforms, *National Energy Platform* should be established and within MENR, *National Energy Strategy Center* that will cooperate with *National Energy Platform* should be set up.

Consumer Council that will have words to say and be influential regarding consumers conditions of procuring energy and energy prices and which will cover consumer associations, professional organizations, trade unions and relevant sector organizations must also be established.

Public monopoly in electricity transmission should continue. Privatized regional electricity distribution should be returned to public property. An electricity generation system which will work with a public planning understanding, functioning and operation and where big capacity public power plants have a significant role will be built. Private generation companies that will accept to play the game according to rules and which will not be allowed to have a controlling share of the market and companies, facilities and persons that generate power for their own requirements will also be elements of this public planning-based system.

Restructuring Energy Sector and Establishing New Organizations (4)

TURKEY ELECTRICITY CORPORATION (TEC)

- **A new public entity, namely TEC will be formed in a structure and organization which will be capable of building and operating electricity generation, transmission and distribution facilities, grids, providing engineering and consultancy services to power plants and grids, manufacture of equipment that will be required during construction, erection, operation, renewing, rehabilitating of generation, transmission and distribution systems in house or in cooperation with existing manufacturers.**
- **Transmission activities should be carried by present TEİAŞ-Turkey Electricity Transmission Corporation and investments that will renew, extend and develop the grid to enable connections of power plants based on renewable energy resources should be made speedily .**
- **Distribution services which have been privatized are being provided by private companies in 21 regions all around Turkey. However, there should be a public monopoly in this segment also similar to transmission. So these privatized companies should be again public property. Those companies who already have significant debts to public corporations, who have not realized the investments they have committed and whose financial status are bad, should be returned to public entity with no payment. Those companies who do not have outstanding debts to public corporations and have made investments more than they committed should receive a payment plan for their extra investments and again returned to TEC.**

Restructuring Energy Sector and Establishing New Organizations (5)

- According to 2019 figures, private companies have a share of 80,5% in generation. In order have a significant public share in supply from the standpoint of supply security and to prevent possible manipulations in electricity prices, public company TEC must have a substantial share both in installed capacity and electricity generation. For this purpose, privatization of public power plants should be stopped. Productive power plants which have public debts and payment problems should also become public property.
- To meet the shortage that will occur when the power plants which continue pollutions are stopped and new demand that cannot be met even with increasing efficiency of power plants, then
  - Big wind farms ,
  - Very large solar power generation yards ,
  - Other planned power plants such as hydro power plants

whose adverse effects to natural and social environs is minimum, accepted by people living in the region and will provide direct and indirect benefits to the people should be made by TEC.

Restructuring Energy Sector and Establishing New Organizations (6)

TURKEY PETROLEUM AND GAS CORPORATION (TPGC)

- As said before, like in many other countries of the world, in Turkey also, oil and gas exploration, production, refining and transmission activities should be carried in a vertical integrated structure and this entity should be capable of providing distribution and sales activities.
- For this purpose, a new entity namely Turkey Petroleum And Gas Corporation (TPGC) which will include TPAO and BOTAŞ should be formed. This Corporation should be capable of providing all relevant services including but not limited to on shore and off shore exploration and production activities, installing and operating oil and gas transmission lines, oil refineries, LNG terminals, under ground gas storage facilities, oil storage facilities and deal with trade, import, export, wholesale and distribution of oil & gas.
- For supply security, public monopoly on transmission should continue, transmission activities of local and foreign companies should terminate and their pipelines should be first transferred to BOTAŞ and then to proposed TPGC. Public entities should have a significant share in imports and storage .
- Gas distribution services provided by private companies all around Turkey (except Istanbul where there is IGDAŞ a municipal gas company) should be returned to public. These services should be provided by public service corporations that will be formed by municipalities and public transmission corporation can also have a share.

Municipalities and Energy (1)

- Municipal authorities should be informed about energy investments that will be made in their regions, support planning and feasibility studies, express their views in all platforms and proposed Province Planning Boards, inform all relevant organizations and all citizens. They should work for having an environmental and social impact analysis study that seriously surveys and questions the environmental, economic and social effects of subject energy investment, search what could be the potential risks and how they can be overcome and note and take into account opinions of all sides that will be influenced starting from people living in the region.
- Municipalities should put one more step and object to neoliberal policies that target transfer of public services to market and private companies, note the realized cases where public services provided by private sector were returned to public entity and with the guidance of successful cases, aim and focus for providing subject systems not by profit oriented municipal companies but through municipal corporations subject to public law system.

Municipalities and Energy (2)

- In order to realize investment and operation activities of national transmission grid and regional distribution grids at national, regional and provincial levels, these activities should be provided within a centralized public structure, in other words within previously proposed TEC body .
- Municipalities in this context should demand:
- Providing services related to services for supply of electricity to customers such as reading, invoicing, customer contract by public entity ,
- Providing natural gas distribution services through new public entities where organizing, decision making, employment, audit mechanisms will be according to public law and municipal entities ,and now BOTAŞ, tomorrow TPGC will be stake holders.
- Municipalities, must note and take into account that a major portion of energy is consumed in transport and fossil fuel-based vehicles are a leading cause of air pollution in cities and give priority to metro and light railways and public mass transport.

Municipalities and Energy (3)

- OTHER MAJOR TASKS, FUNCTIONS AND MUNICIPALITES RELATED TO ENERGY
  1. To be informed about national policies and regulations
  2. The right to speak about site selection for projects
  3. Utilize and benefit from solar energy in a country of sun
  4. Utilizing other renewable energy resources
  5. Efficient use of energy
  6. Benefiting and auditing thermal power plants
  7. Support to energy cooperatives
  8. Support to energy poor

Local Manufacture of Energy Equipment

- Major components for wind power generation, towers, rotor blades, generators, revolving table gears and many other accessories are manufactured locally. *National Wind Power Energy Equipment Platform* that will be formed with participation of all relevant parties (manufacturers, academy, professional associations, engineering chambers, MENR, related public corporations etc.) should consider studies for developing local design, measures to direct local manufacture to meet country's local needs, export goods and increase employment.
- Local manufacture of solar power generation is behind wind power equipment. It is computed that installed power technical capacity for full use of solar power generation is about 250.000 MW. In order to evaluate this high potential according to results of detailed feasibility studies that will be made, installing high-tech facilities with large capacities must be foreseen and R+D studies must be supported. In addition to direct and indirect employment opportunities that proposed facilities will create, with projects such as finding the locations suitable large solar farms, preparation of land ready for installing panels and construction of roads, installing solar panels, construction of lines to connect to grids, the solar power generation projects should be converted to big social development attempts.
- Importance should be given and proper funding must be provided to scientific and technologic studies for energy storage projects.

INFORMATION ABOUT THE PRESENTATION

I. This Presentation has been prepared and translated by below listed members and advisers of Energy Commission of UCTAE Chamber of Mechanical Engineers:

- Oğuz TÜRKYILMAZ, Industrial Engineer, Chairman of Energy Commission of UCTAE Chamber of Mechanical Engineers ,
- Orhan AYTAÇ, Mechanical Engineer, Member of Energy Commission of UCTAE Chamber of Mechanical Engineers ,
- Yusuf BAYRAK, Mathematician, Advisor of Energy Commission of UCTAE Chamber of Mechanical Engineers ,

II. English translation is a summarized version of master presentation dated 13.05.2020.

III. Citations can be made with the condition of giving reference.

With our sincere compliments to Energy Commission of METU Alumni Association and Board, Directors and Staff of UCTAE Chamber of Mechanical Engineers

COMMUNICATION

oguz.turkyilmaz@mmo.org.tr orh.aytac@gmail.com yusufbayrak19@gmail.com

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WE DO NOT WANT TO POLLUTE AND GET DIRTY

WE WISH PEACEFUL, EQUAL, FREE, RIGHTEOUS, LAWFUL, BRIGHT AND CLEAR WORLD AND INDEPENDENT AND DEMOCRATIC TURKEY