



GENERAL DIRECTORATE OF TURKISH COAL ENTERPRISES

REPUBLIC OF TURKEY
MINISTRY OF
ENERGY AND
NATURAL RESOURCES



SOMA COAL BASIN AND MINING OPERATION

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HEADLINES

I- ENERGY AND COAL INFORMATION OF TURKEY

II- SOMA COAL BASIN AND MINING OPERATION

III- SOMA MINE ACCIDENT

IV- FUTURE OF COAL MINING AFTER SOMA MINE ACCIDENT

V- CONCLUSION

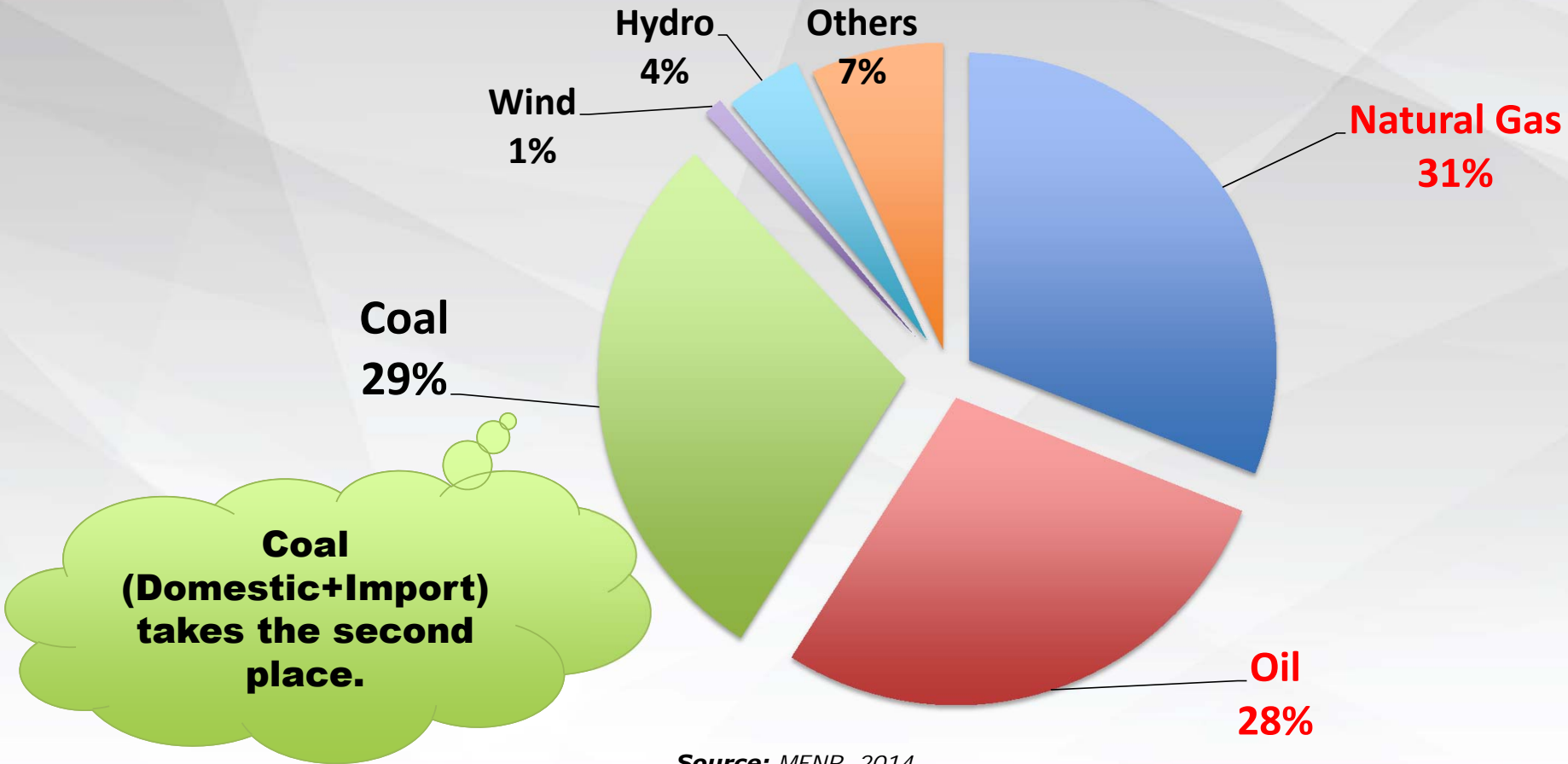


ENERGY and COAL INFORMATION OF TURKEY



ENERGY and COAL
INFORMATION OF
TURKEY

PRIMARY ENERGY CONSUMPTION IN TURKEY, 2014

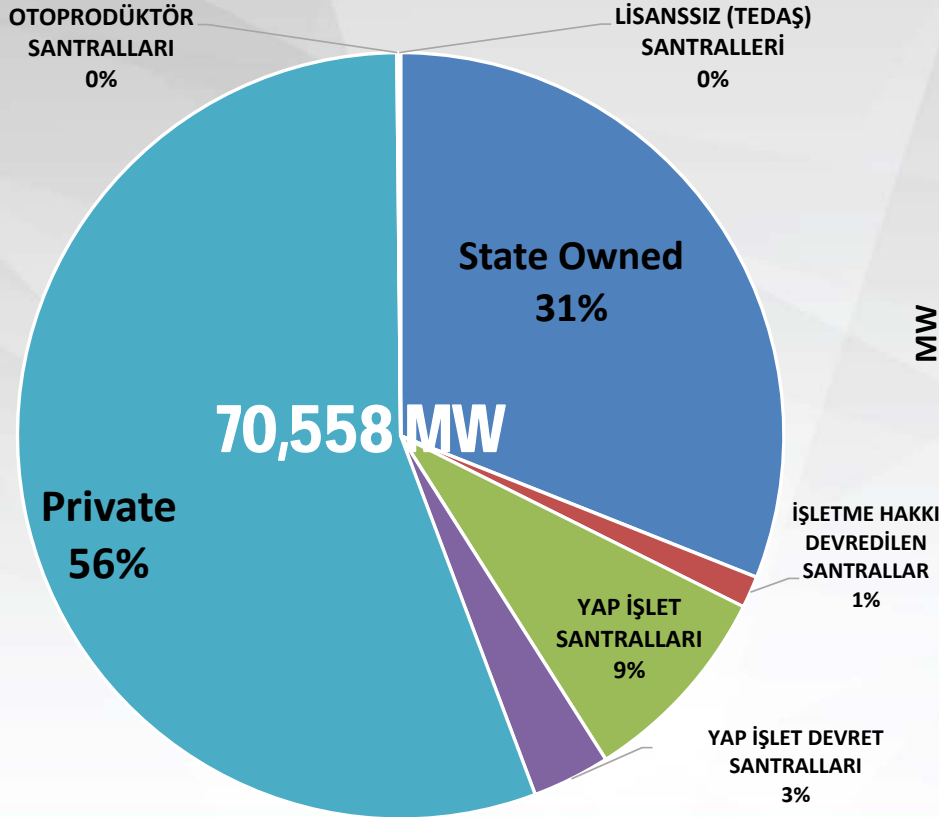


Source: MENR, 2014

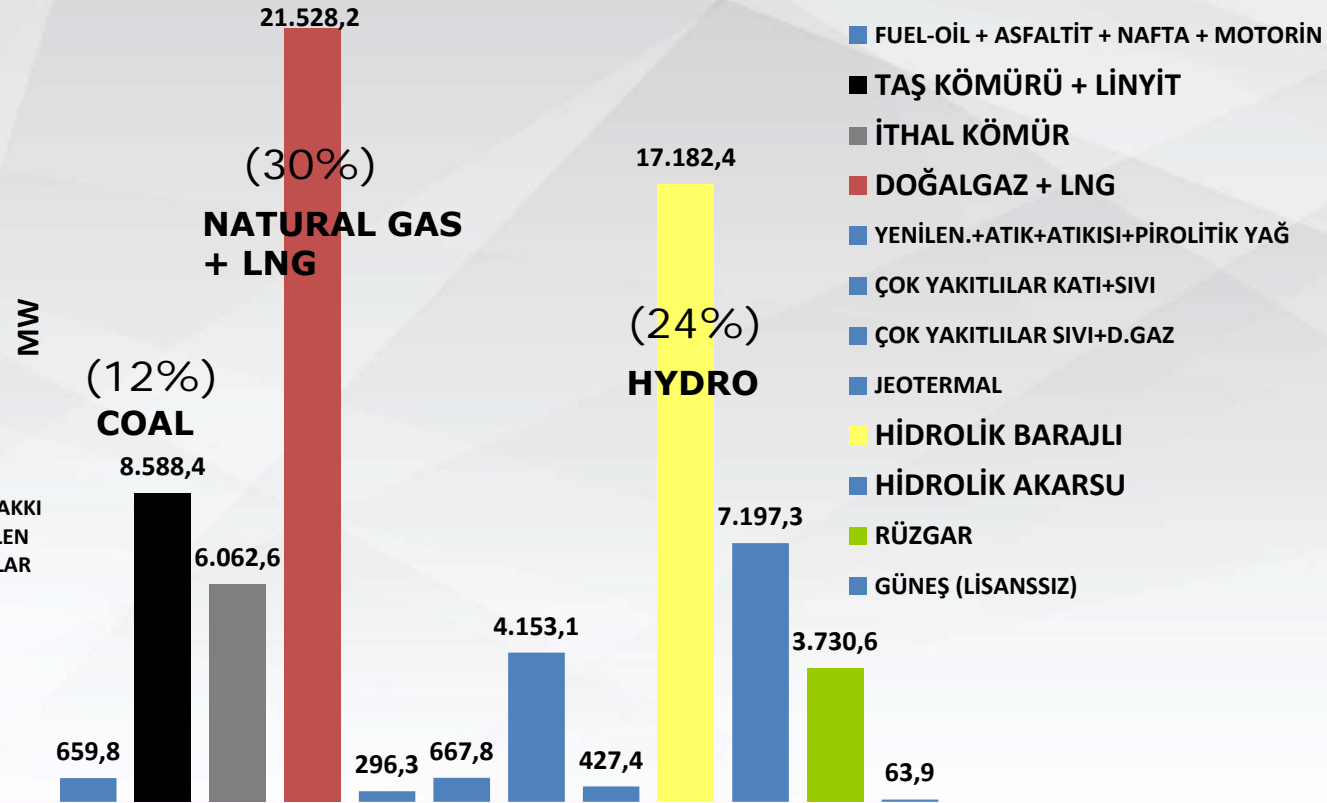


TURKEY'S INSTALLED ELECTRICITY GENERATION, 2015

INSTALLED CAPACITY BY PRODUCERS



INSTALLED CAPACITY BY FUEL TYPES



Source: TEİAŞ, 2014

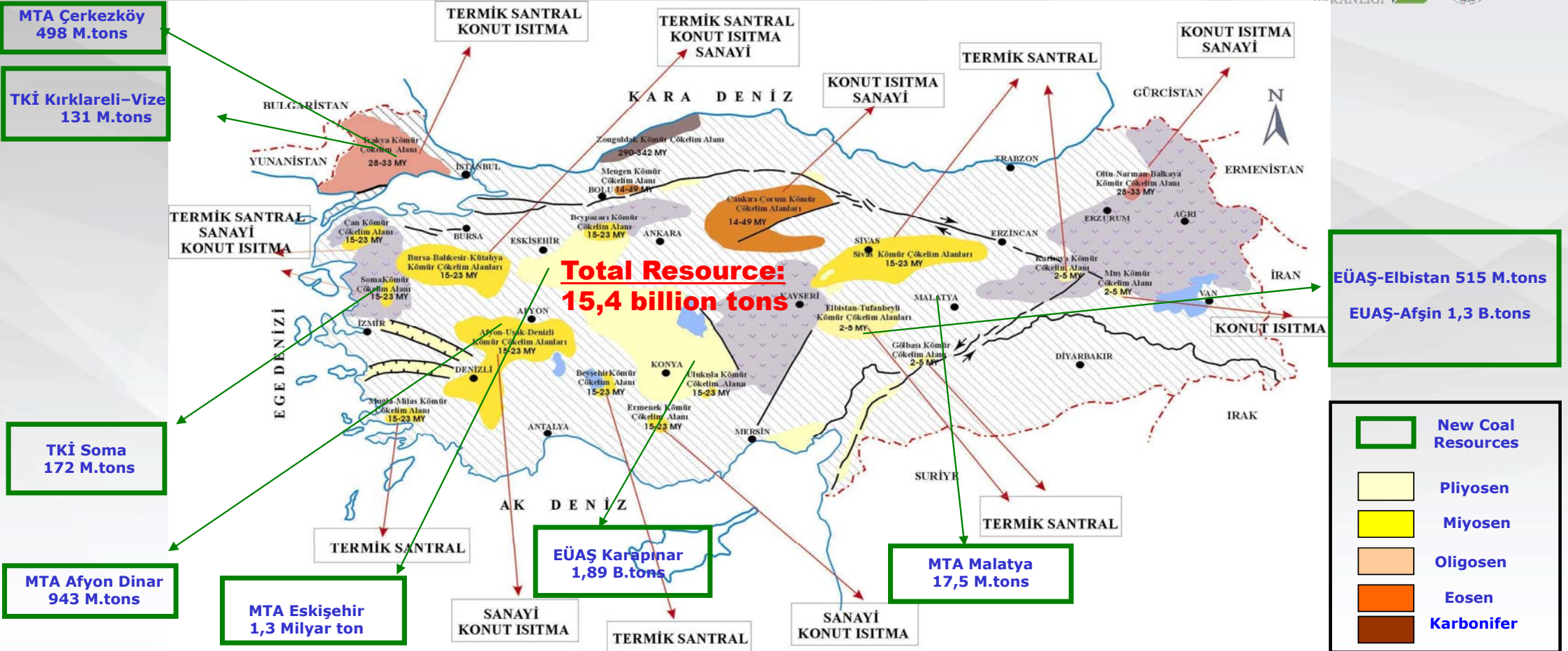


...AND COAL IN TURKEY?



**ENERGY and COAL
INFORMATION OF
TURKEY**

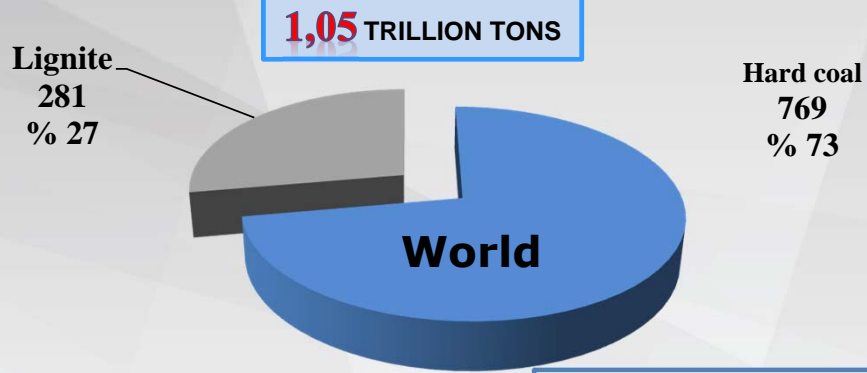
COAL RESOURCE AREAS OF TURKEY, 2015



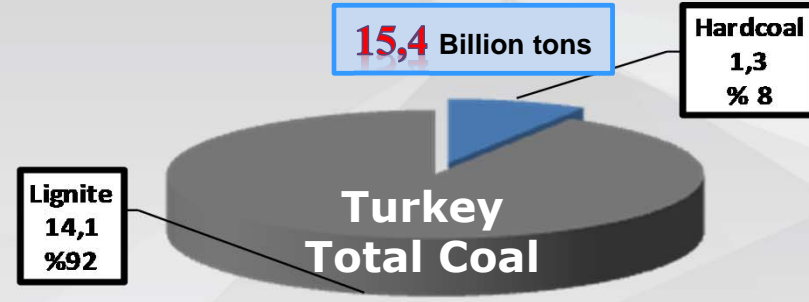
ENERGY and COAL INFORMATION OF TURKEY

COAL RESOURCES OF TURKEY

Coal Resources of the World (Billion Tons)

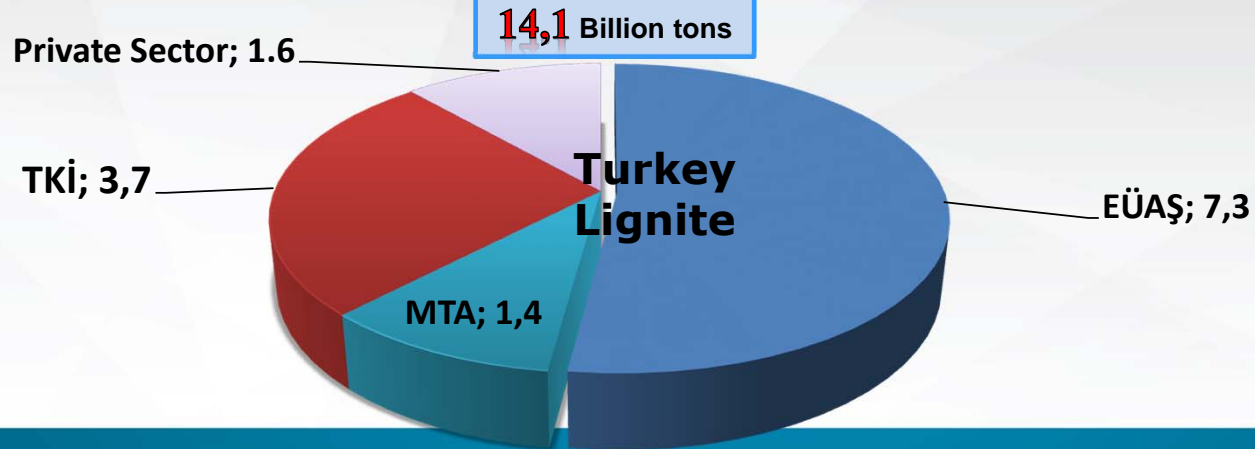


Coal Resources of Turkey (Billion Tons)



Source: MTA 2015

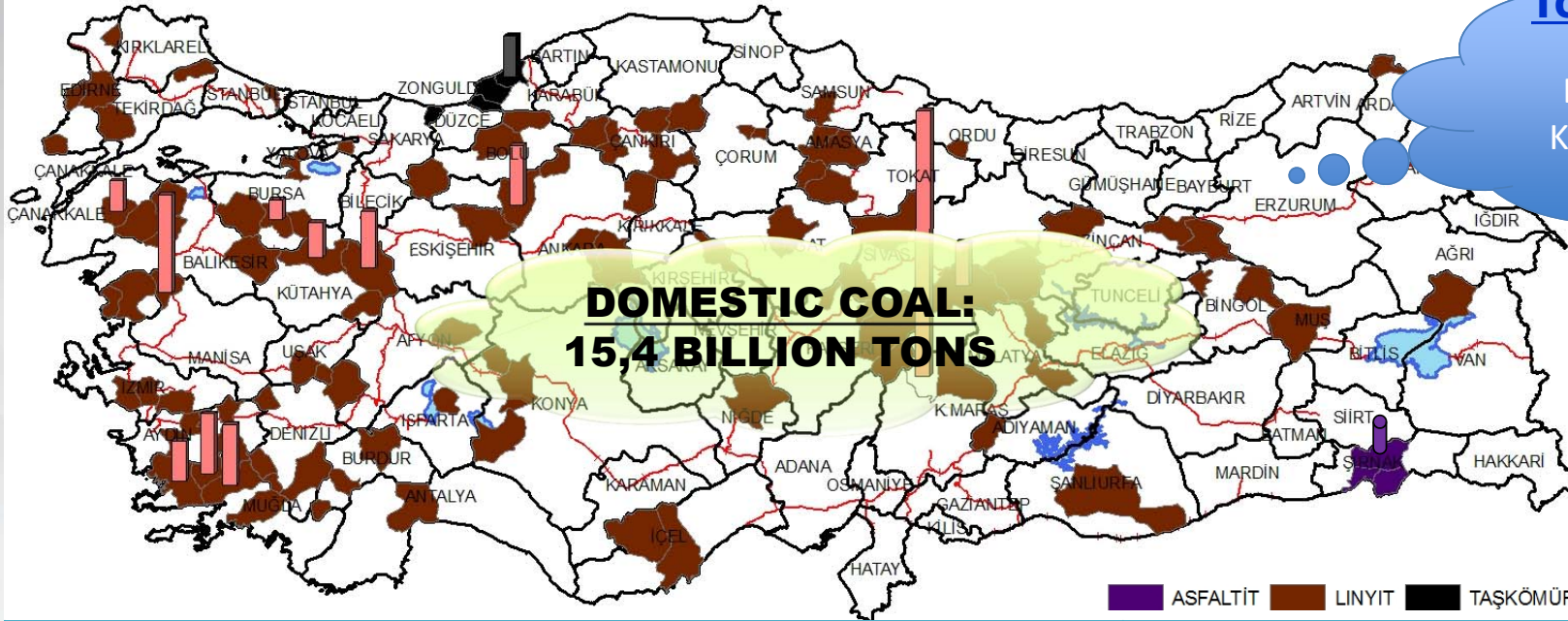
Lignite Resources of Turkey (Billion Tons)



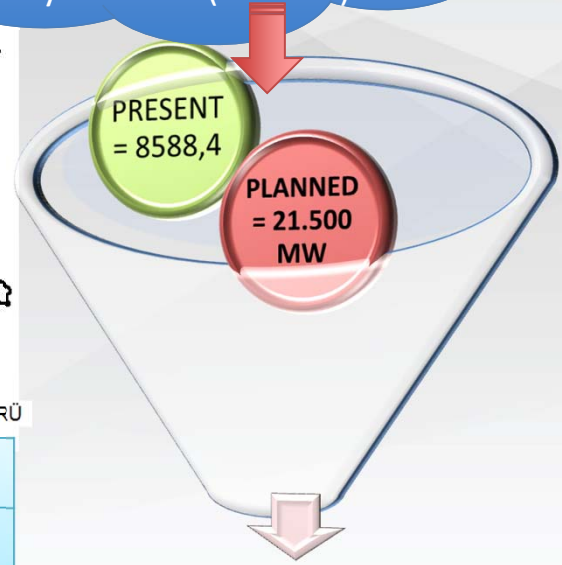
Life time in Turkey:
220 years



THERMAL POWER PLANTS FED BY DOMESTIC COAL



TOGETHER WITH NEW LIGNITE FIELDS:
 Eskişehir Alpu (1,5 BT),
 Konya Karapınar(1,8 BT),
 Afyon Dinar (940 mT)



TOTAL INSTALLED CAPACITY, MARCH 2015	70.558 MW
THERMAL POWER PLANTS FED BY DOMESTIC COAL	8.588,4 MW
RATIO IN TOTAL	% 12

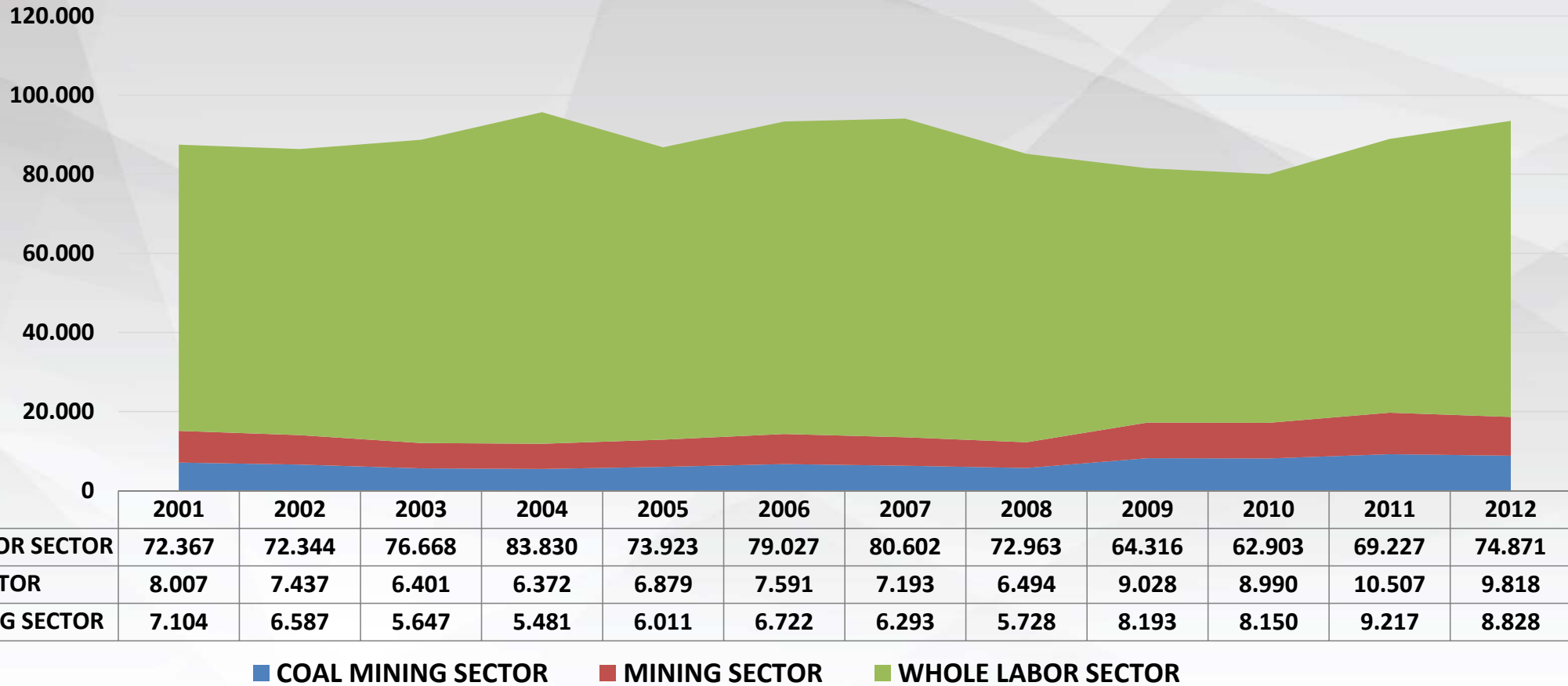
TOTAL DOMESTIC IN THE FUTURE: ≈ 30.000 MW



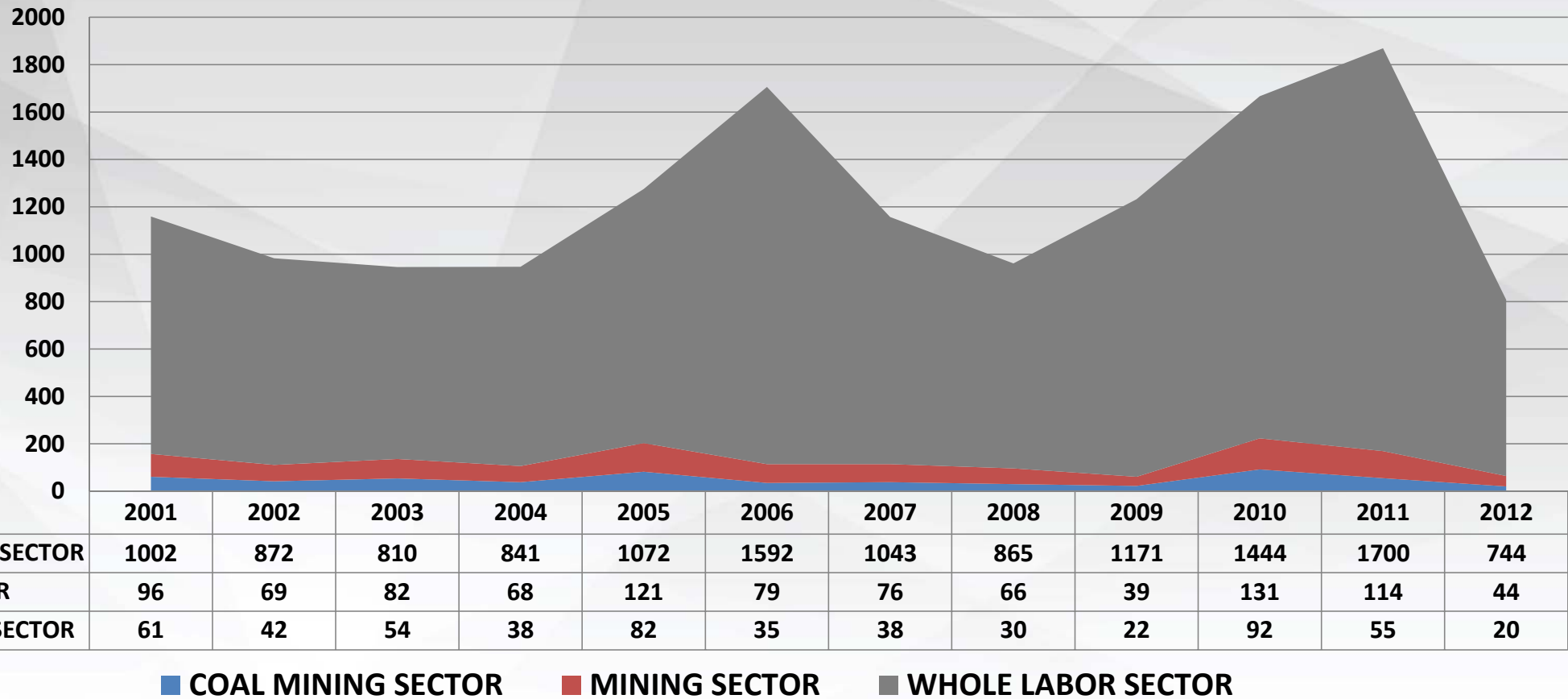
...AND OCCUPATIONAL HEALTH AND SAFETY STATISTICS?



TURKEY'S OCCUPATIONAL ACCIDENT STATISTICS



TURKEY'S OCCUPATIONAL FATAL ACCIDENT STATISTICS

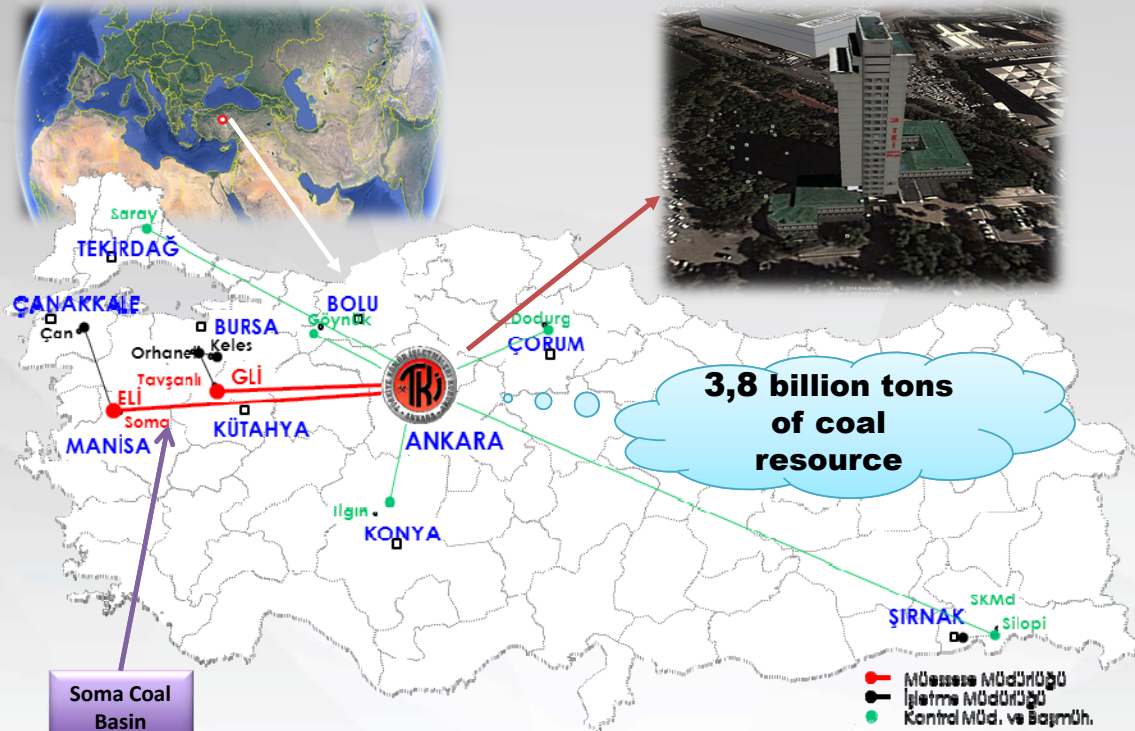




SOMA COAL BASIN AND MINING OPERATION



GENERAL DIRECTORATE OF TURKISH COAL ENTERPRISES



Soma Coal Basin

FIRST 500 COMPANIES OF TURKEY

TKI	PUBLIC		WHOLE	
	2012	2013	2012	2013
EMPLOYMENT	4	5	8	11
PROFIT	2	4	3	29
ENDORSEMENT	2	4	15	26

TKI was established in 1957 as a government establishment company;

Offers an important contribution in determining the State's energy policies;

Together with the tender procedure, TKI performs approximately 25-30 million tons of marketable coal which is one third of Turkey's annual production and a large portion of the coal (80%) is given to power plants;

Yearly 200-250 million m³ of stripping being done and more than half of it done with the tender procedure;

Projects that have a modern business.

- ELİ Aegean Lignite Establishment Directorate Soma/Manisa
- Çan Lignite Directorate Çan/Çanakkale
- GLİ Garp Lignite Establishment Directorate Tavşanlı/Kütahya

- Konya -Ilgın Control Directorate
- Silopi Control Directorate
- Göynük Control Directorate
- Dodurga Control Directorate
- Saray Control Directorate

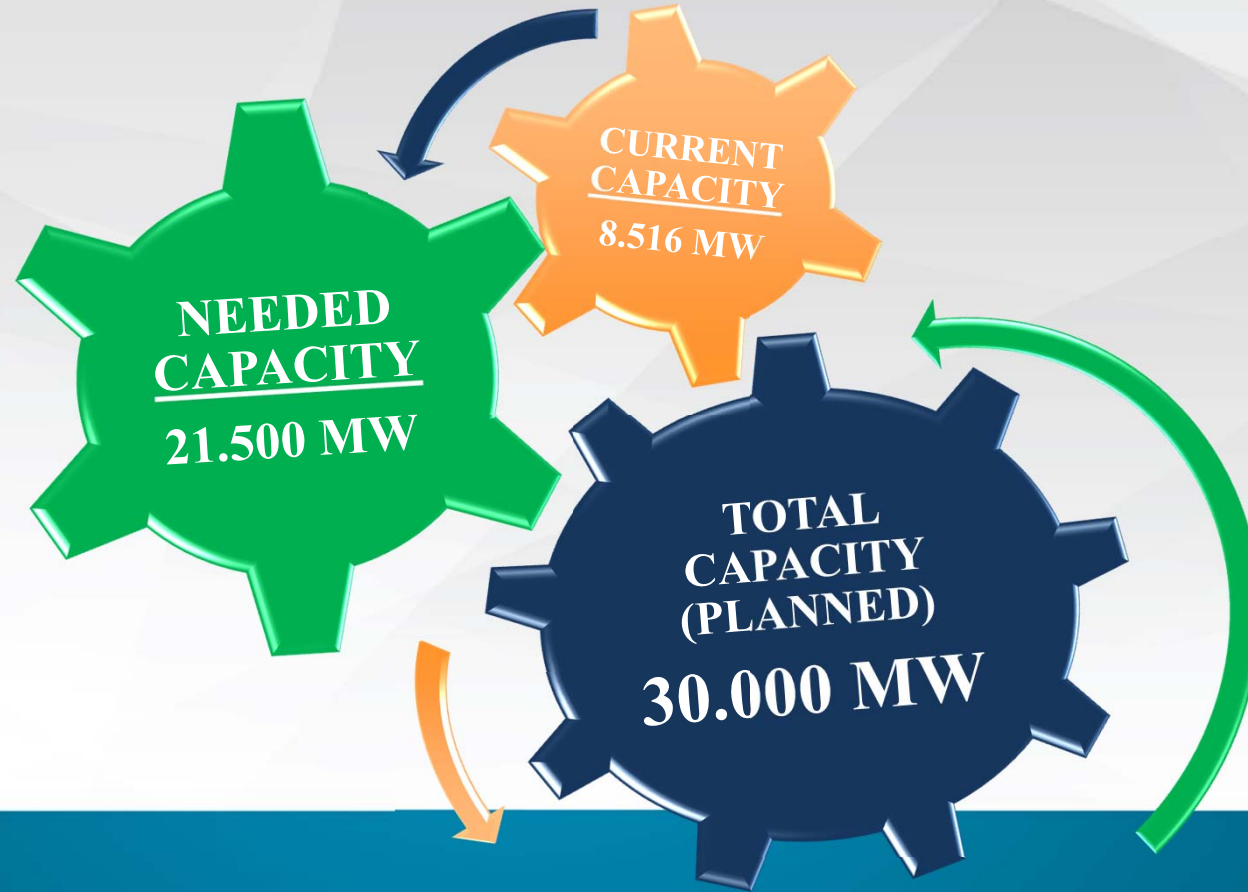


ROYALTY PROCEDURE OF TKI TO INCREASE THE INSTALLED CAPACITY BY USING DOMESTIC COAL AS FUEL

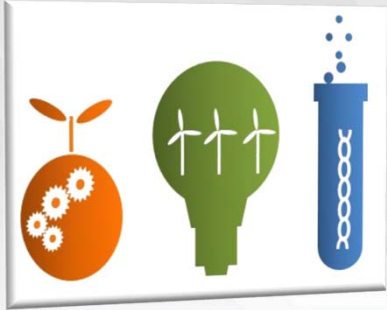
THE MODEL
OF TKI



GETTING MONEY
FROM SHARE UNITS OF
ELECTRICITY
GENERATION
(Kr/kWh)
ROYALTY
(REDEVANS)



R&D WORKS OF TURKISH COAL ENTERPRISES



Installing Pilot-scaled Plant On Lignite Gasification At TKI'S Kütahya Mine

Installing Lab Scale Plasma Lignite Gasification Plant Project

Installing Coal+Biomass-to-Liquid Plant Project. Fuel Oil Production from Biomass and Coal Mixture (KAMAG 1007 TUBITAK PROJECT)

Improving of Oxidized Combustion Technology (SOMALOX - EU 7. Chapter)

Feasibility Study On Gasification Of Turkish Coals

Underground Coal Gasification Feasibility Study

Lab Scale Underground Coal Gasification Study

MicGas Coal Biotechnology Project (HUMIC Acid)

Methane Cogeneration Project with German Green Gas Company (Soma)

Project On Optimization Of High-Ash Lignite Gasification

(OPTIMASH-EU 7. Chapter) Project.

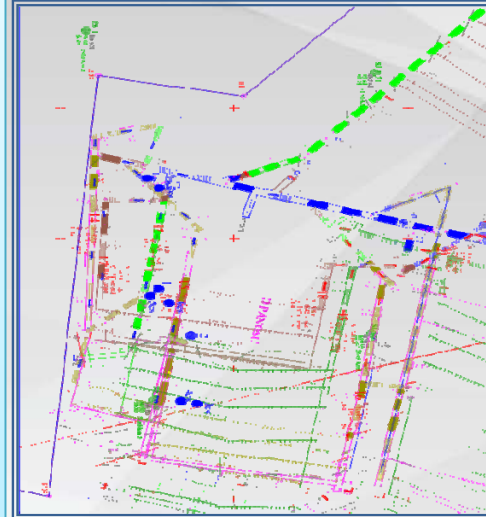


Background of Methane Cogeneration Project with German Green Gas Company

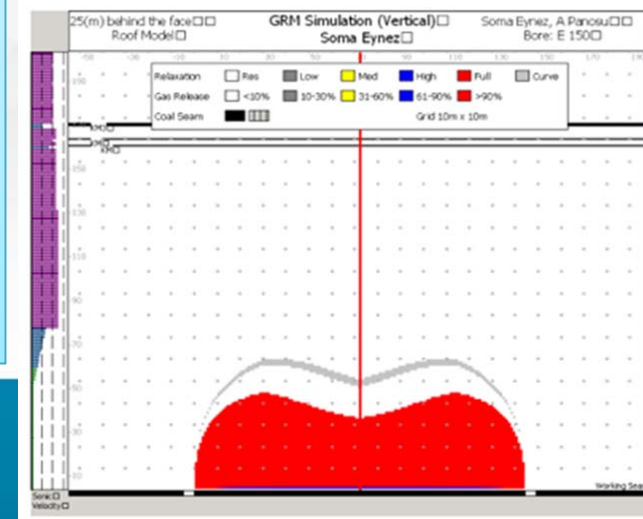
- Underground coal resources of Soma-Eynez are produced from several longwalls. Due to spontaneous combustion propensity of the coal, the rate of ventilation air provided to the mine during coal extraction is kept limited without compromising methane concentration, which is usually less than 1 percent, in the mine.
- However, the experience in mining of Panel A had been quiet different. Mine personnel measured unusual methane concentrations in roadway development, as well as in mining of the upper bench of the coal seam.
- High methane concentrations experienced at the working depths of Panel A led to the expectation of having even higher methane levels at deeper sections.

• Therefore:

- Mining operations were suspended in the panel and the roadways were sealed with stoppings to isolate the panel from rest of the mine.
- GreenGas DPB was contracted for a feasibility study for Panel A and its vicinity for sampling coal and gas, for evaluating gas conditions and for assessing methane drainage options.



- Desorption and flow tests for gas content and emission measurement
 - Samples were taken from the in-mine holes drilled into the coal at different lengths
 - Average gas content from all locations were determined as $\sim 0.23 \text{ m}^3/\text{t}$.
 - Gas rate measured from coal seam ~ 1.25 liter/min.



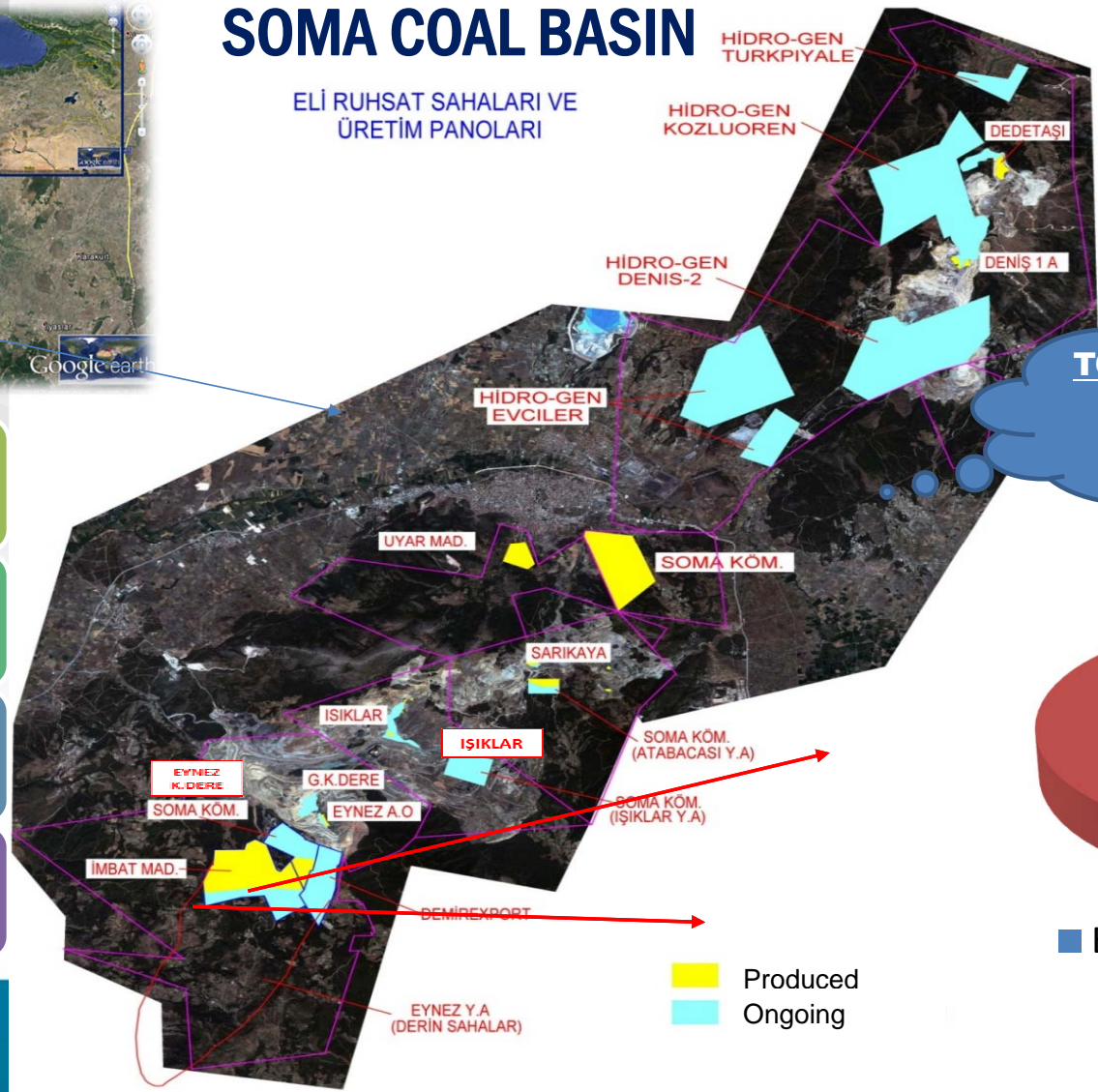
Modeling of gob formation in Panel A

- Potentially existing gob of Panel A as a result of mining of the upper 2-m bench of the KM-2 seam was modeled.

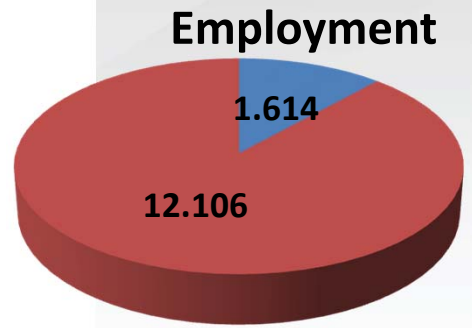


SOMA COAL BASIN

ELİ RUHSAT SAHALARI VE ÜRETİM PANOLARI



**TOTAL RESOURCE:
704 MILLION
TONS**



■ ELI ■ CONTRACTOR

Soma Coal Basin found out in 1864.

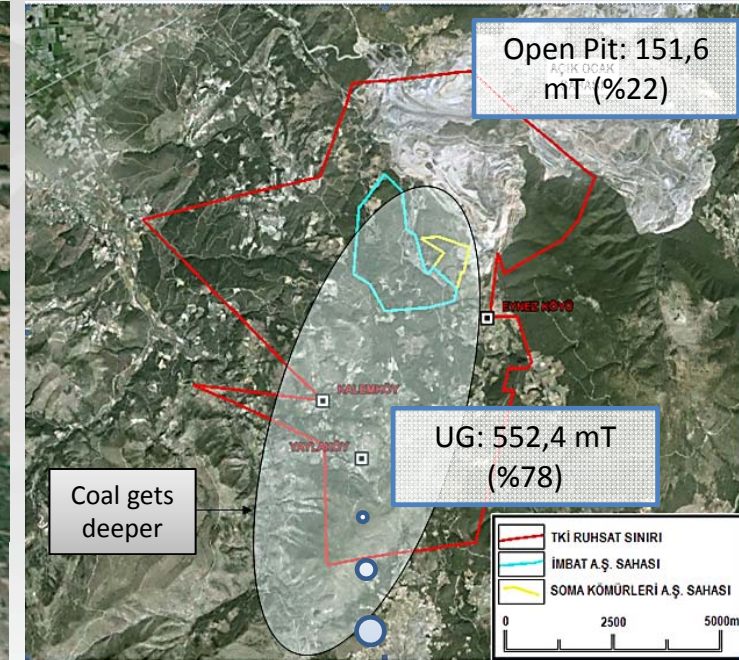
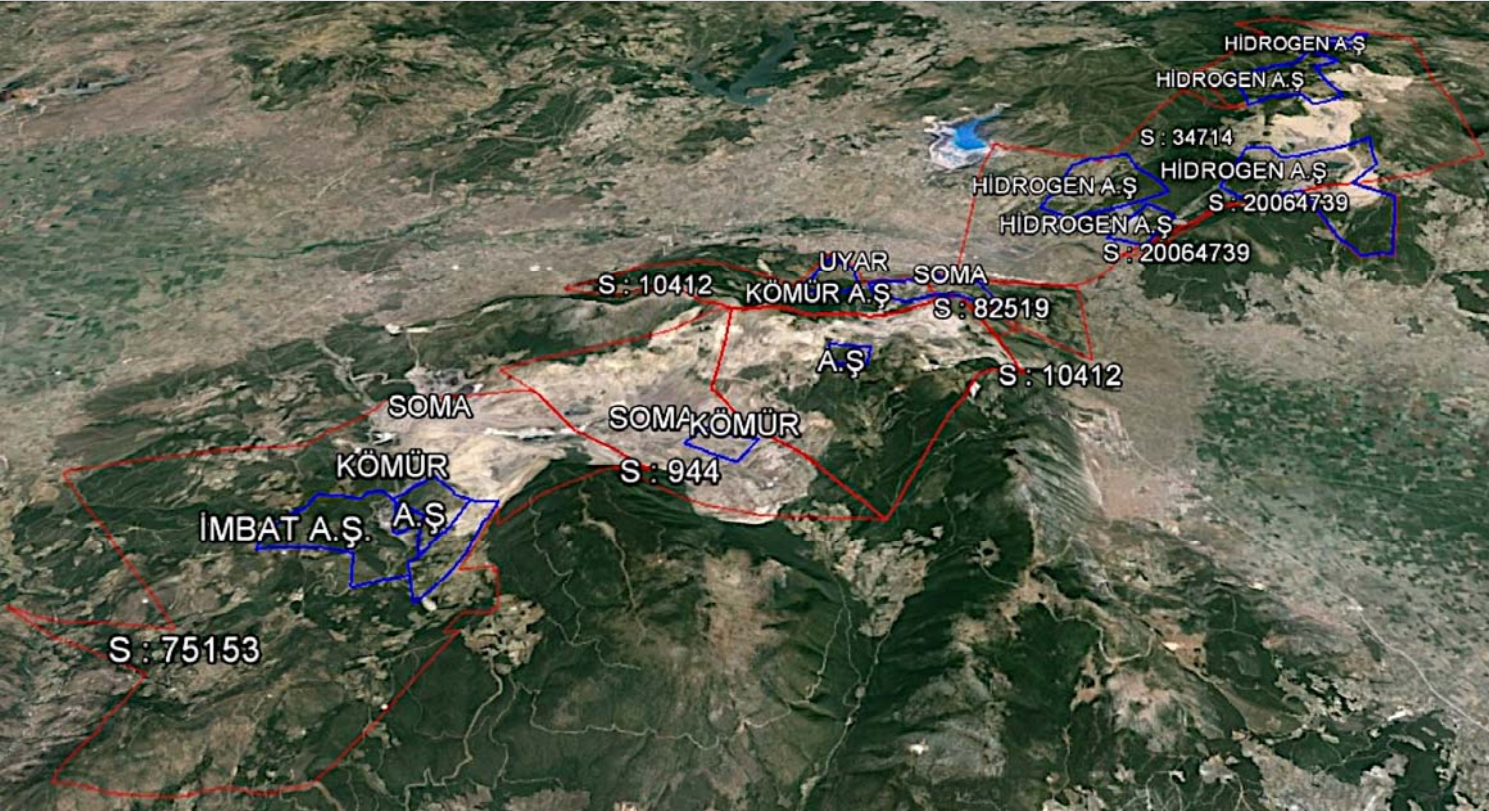
French companies operated the mine between the years of 1918 to 1922 at World War 1st.

1922 to 1939, operated by Turkish private sector.

After 1939, operated by government.



TOPOGRAPHY AND COAL RESOURCE OF SOMA



**TOTAL RESOURCE:
704 MILLION TONS**



ELI ENTERPRISE DIRECTORATE (Manisa/Soma)



1034 MW (2x22, 6x165)

SOMA THERMAL POWER PLANT

RESOURCE (Mt)	PRODUCTION CAPACITY (Mt/year)	MINING METHOD
769	17,8	Open Pit+U.G.

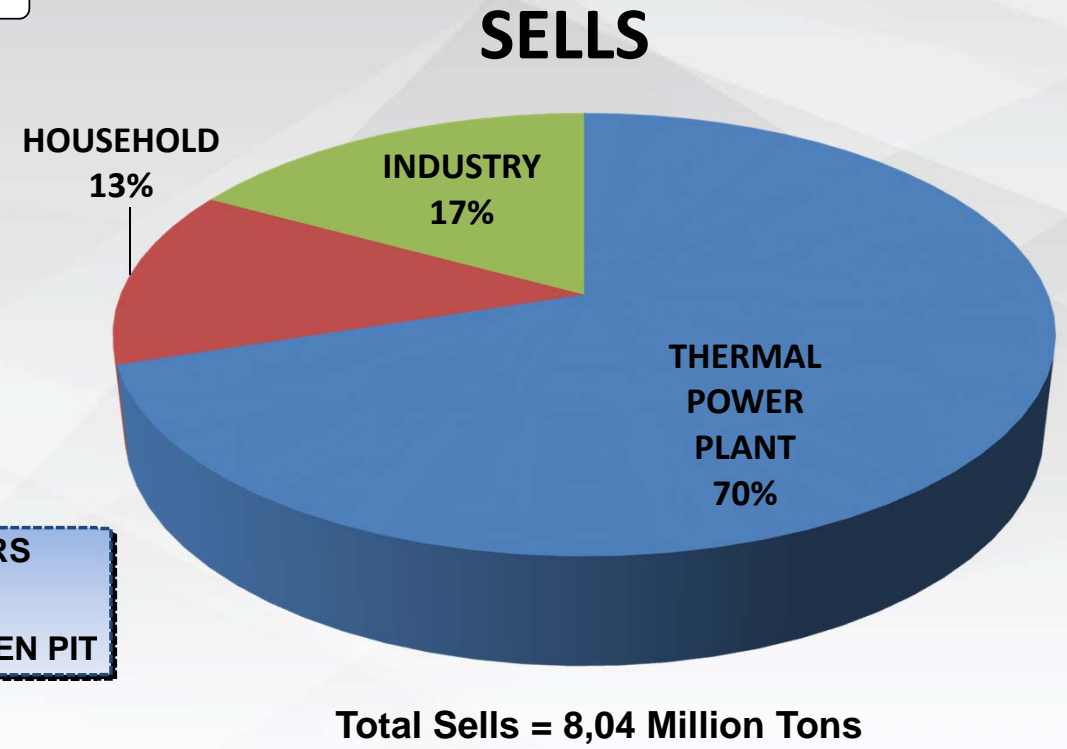
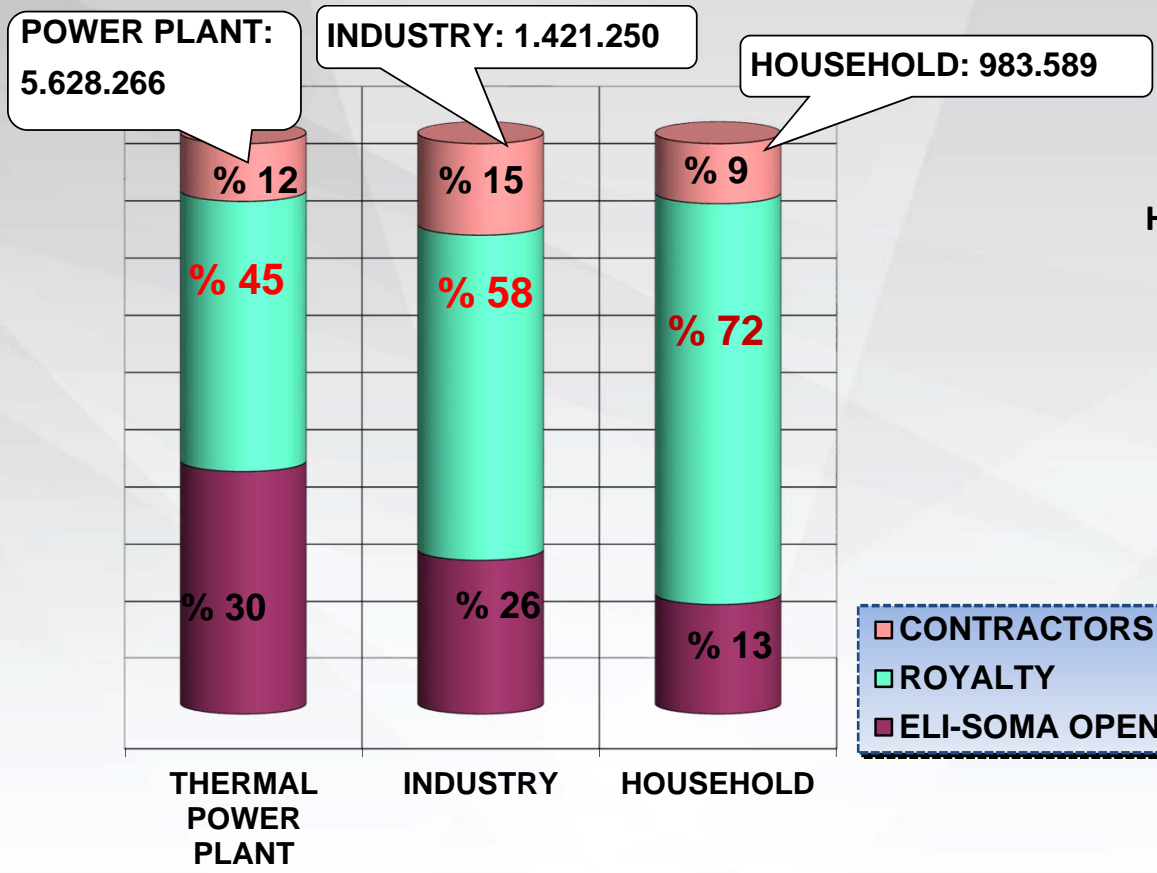
247 mT coal produced by Open Pit method. 104 mT coal produced by Underground Method. Total produced coal in 1940 to 2013 is 351 mT.

910 milyon m3 overburden stripped during the years of 1940 to 2013.



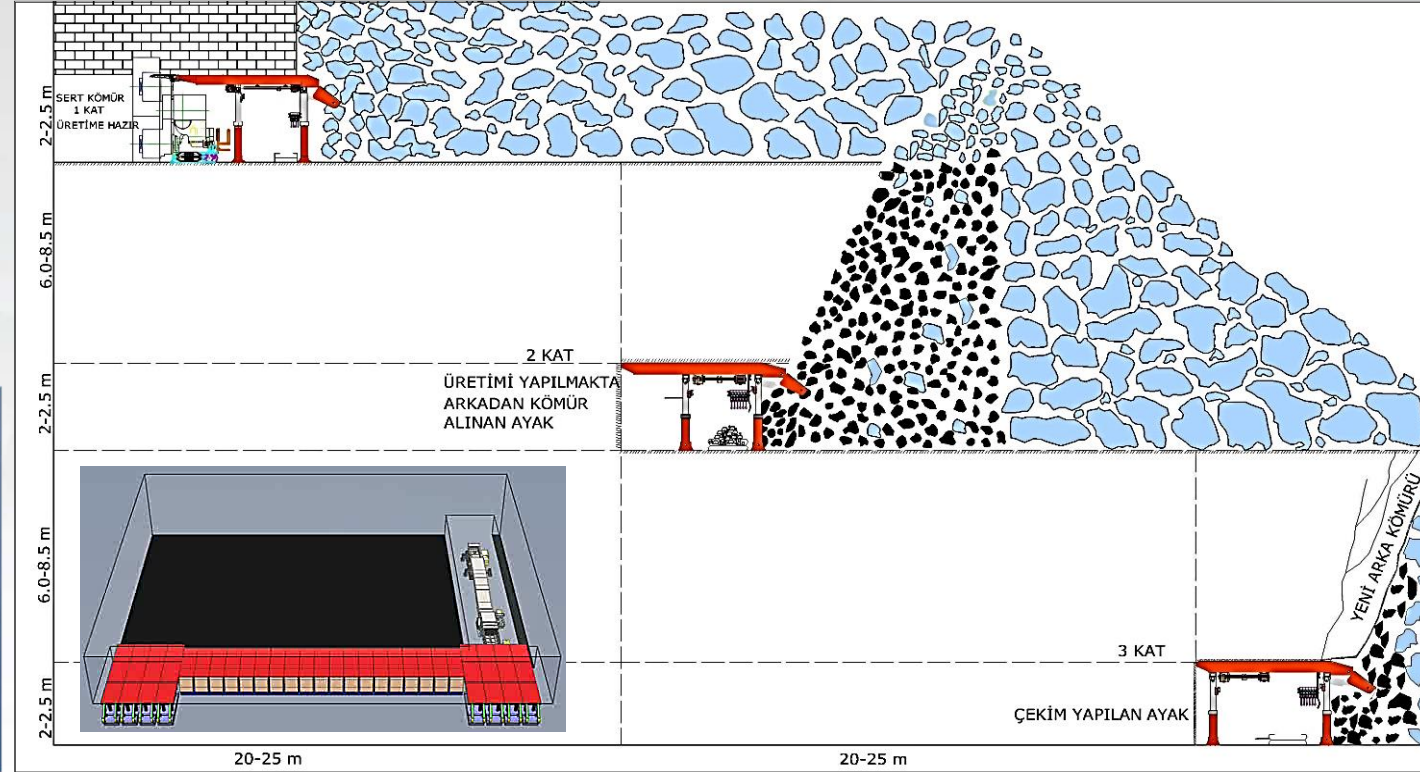


SELLS IN TKI'S SOMA COAL MINE



UNDERGROUND MINING PRODUCTION TECHNIQUE

(RETREATED LONGWALL MINING)



UG Methods of Soma Depends on Geological Structure:

- Fully mechanized (Soma Mine)
- Half mechanized (Eynez Mine)
- Classical methods (Eynez-Karanlıkdere)





INJECTING ASH TO PREVENT FIRES

(KÜL RAMBLE SİSTEMİ)

- Because of having spontaneous combustion, miners have to face fire problems during producing coal.

- To prevent fire problems, ash which is brought from the thermal power plant, used at the mine by mixing with a suitable content of water and injected to produced seams. This procedure prevents fires and spontaneous combustion.



SUPPORT SYSTEMS IN SOMA'S UG GALLERIES

Support Systems

➤ TH

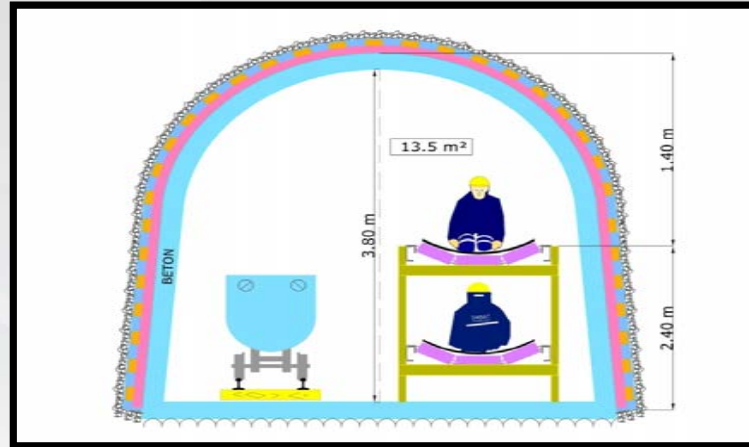
- TH 29 B9
- TH 34 B11 B14

➤ GI

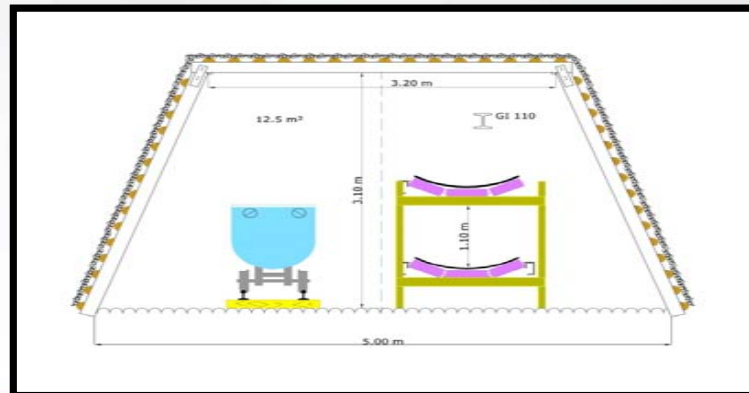
- GI 110
- GI 140

➤ Wood (rarely)

➤ Shotcreet (rarely)



GI 110 Support



TH Support





MINE ACCIDENT





SITE OF THE ACCIDENT ?



MINE ACCIDENT

- ON TUESDAY MAY 13, 2014 AT AROUND 15:00, WE WERE FACED WITH THE GREATEST HUMAN LOSS FROM A MAN-MADE DISASTER IN OUR MODERN HISTORY.
- THE DISASTER BEGAN WITH UNDERGROUND MINE FIRES THAT SPEWED OUT DENSE CARBON MONOXIDE, POISONING AND KILLING HUNDREDS OF MINERS AS WELL AS MINING ENGINEERS.



Rescue operations finished in 17th May of 2014. Unfortunately **301 miners** dead and **486 miners** were survived.





HOW DID IT HAPPEN?

NASIL GERÇEKLEŞTİ?

787 KİŞİDEN OLUŞAN MADENCİLERDEN



MADEN ŞEHİDİ: 301 KİŞİ



SAĞ: 486 KİŞİ



1

13 Mayıs 2014 tarihinde Salı günü, Saat 14:45 civarında, meydana gelen olay, madene girişten yaklaşık **1800 metre** mesafede ve yeryüzünden **150 metre** derinlikte ocağa temiz hava taşıyan ana galeride meydana gelmiştir.

2

MADENDE 787 İŞÇİ BULUNUYORDU
Eynez bölgesindeki Soma AŞ maden ocağında 787 işçi çalışıyordu. Patlama, vardiya değişimi sırasında meydana geldi.

3

ÖLÜMLER KARBONMONOKSİT GAZIYLA GELDİ
Patlama dolayısıyla madenin elektrikleri komple kesilince, karbonmonoksit gazını dışarı tahliye eden fanlar çalışamaz hale geldi. Tünelin içinde kalan işçilerin, ölümlerinin bu sebeple gerçekleştiği düşünülüyor.

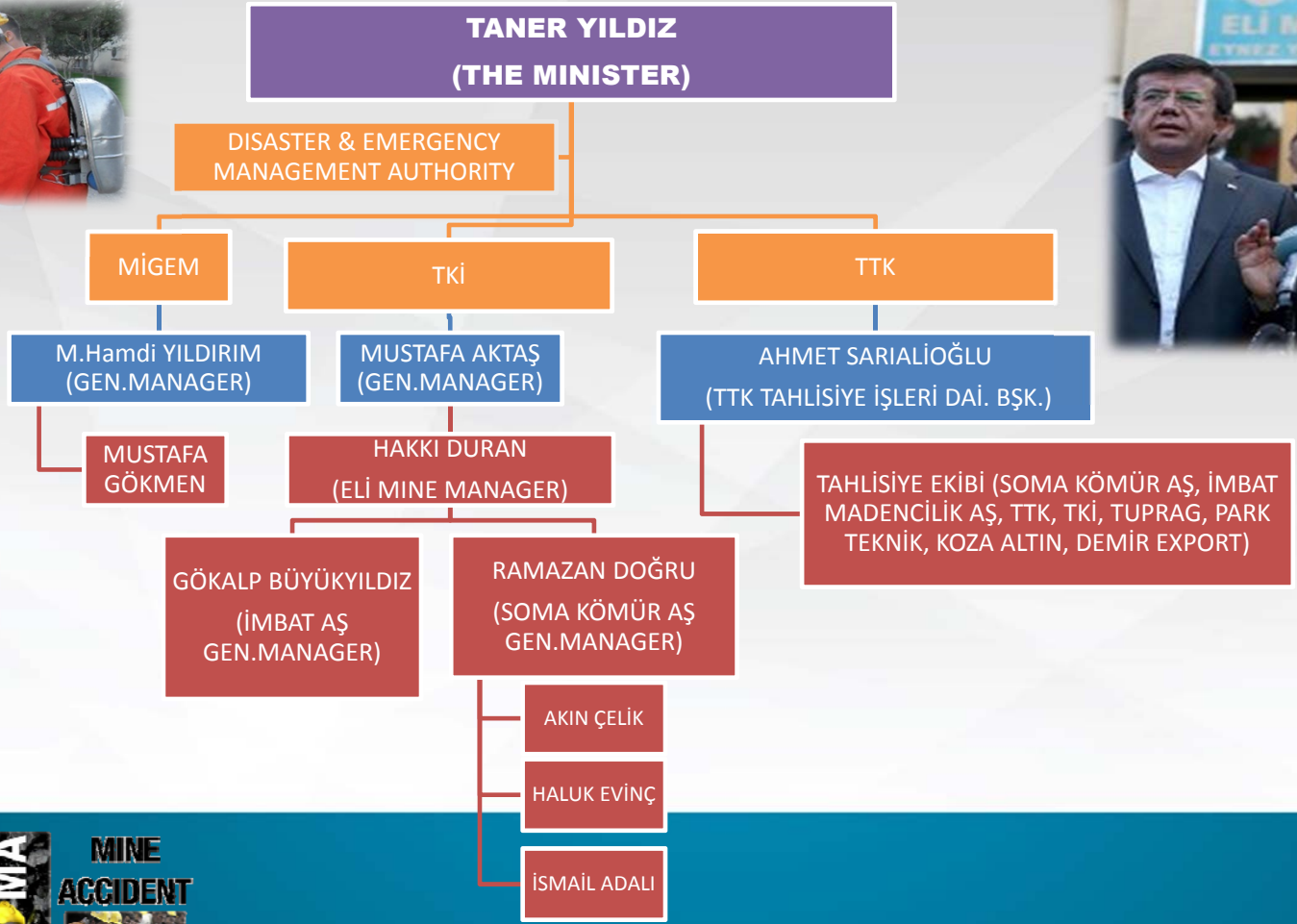
4

486 İŞÇİ KURTULDU
Patlamadan hemen sonra tünelin kapağına yakın tarafında olan yaklaşık 150-200 civarındaki işçi durumu fark edip ana giriş tünellerine doğru koşarak kendilerini dışarı attı. Tünelde **301** işçi ölü 80 madenci de yaralı olarak çıkarıldı.

5

HAVA AKIMI TERSİNE DÖNDÜRÜLDÜ
Olay esnasında içeriye Oksijen pompalandı. Bu sayede bir çok madenci kurtuldu.

RESCUE UNIT ORGANIZATION AND CRISIS MANAGEMENT



JUDICIAL PROCESS AND INVESTIGATION OF THE ACCIDENT BY TECHNICAL EXPERTS



AFTER THE ACCIDENT



After the accident:

- Judicial process of the accident still going on.
- Expert investigation technical report published.
- A parliamentary investigation committee was established by the Turkish Parliament and a report was published by the committee after finishing the investigation (December, 2014).



IV

FUTURE OF COAL MINING AFTER SOMA MINE ACCIDENT



IV FUTURE OF COAL MINING
AFTER
SOMA MINE ACCIDENT



SOMA BASIN'S CONTRIBUTION TO ECONOMY AND EMPLOYMENT

704 million tons of coal meets the needs of thermal power plant (990 MW)'s coal supply. The power plant's generation is 2,5% of Turkey's total consumption.

15 million tons of coal produced at Soma Coal Basin.

Employment is 15 thousand people. In mining, indirect effect of the employment is 10 times so the indirect employment is 150 thousand people.

Annually 5% of population increase in Soma region. Thus, with a population of 120 thousand people; Soma doesn't have unemployment problems.

Soma's contribution to economy is about 2,5 % of Turkey's total. Thanks to Soma, city of Manisa takes 20th rank in between 81 cities.



IV FUTURE OF COAL MINING
AFTER
SOMA MINE ACCIDENT



WHAT IF WE GIVE UP PRODUCING COAL IN THE UNDERGROUND MINES?

16 million tons of coal for Turkey's household and industry needs, of total's 13,5 million tons of coal is supplied by indeneous coal.

Turkey has paid 4,6 billion US \$ in 2012 for import coal.

The knowledge of underground mining will be lost.

Turkey is dependent of energy in lack of petroleum and natural gas over 90%. In addition to coal this dependency, Turkish economy will be in a MESS.



IV FUTURE OF COAL MINING AFTER SOMA MINE ACCIDENT



V CONCLUSION



VISION ZERO





AFTER SOMA...

Independently of the accident, technical and legislative works are still being continued by the guidance of MENR.

TKI gives a great attention to apply those best high tech applications which is used in mining at other improved countries.

Lots of technical improvements applied at coal mines and some important legislation amendment to the law changed.

There are some ongoing legislation works waiting to be changed. Turkey has devoted itself in serious ongoing studies not only in Soma Coal Basin but also in all of the mines to prevent accidents and to achieve the world standards of OHS towards the ISSA Mining's philosophy of "Vision Zero" and improving the productivity by using best modern techniques.



V CONCLUSION



OF TURKEY'S NEED OF OVER 100 MILLION TONS OF COAL:

IMPORT OF COAL

DOMESTIC PRODUCTION

✦ IF 75 MILION TONS OF COAL WILL BE IMPORTED:

15 BILLION US \$ WILL BE PAID;

✦ IF 120 THOUSAND LABORS LOSE THEIR JOB (*TÜİK*):
1,5 MILLION PEOPLE WILL BE INFLUENCED and WILL
LOSE THEIR JOB;

✦ WHAT IF GIVING UP 15,4 BILLION TONS OF COAL:
✦ ENERGY SUPPLY SECURITY ISSUES and AN ENERGY
DEPENDENT COUNTRY.

- ☑ DEPENDENCY FOR THE ENERGY WILL BE DECREASED and GOALS OF 2023 WILL MEET.
- ☑ CONTINUE TO WORK WITH 120 THOUSAND LABORS IN COAL MINING SECTOR (*TÜİK*); UNEMPLOYMENT WILL FINISH AND CONTRIBUTION TO ECONOMY WILL INCREASE.



V CONCLUSION



CHOOSING DOMESTIC COAL PRODUCTION:

Continue to give great attention to apply those best high tech applications which is used in mining at other improved countries....

USA

AUSTRALIA

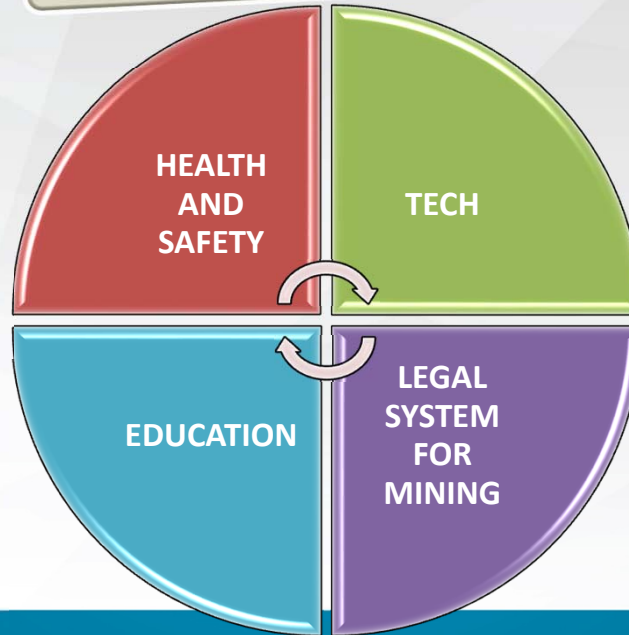
GERMANY

CANADA

S.AFRICA



VIRTUAL REALITY TECH FOR MINERS...



V CONCLUSION



VISION ZERO

IMPORTED



Natural Gas



Petroleum Propane

IMPORTED

Hydrogen



POOR RESOURCE



Solar

DOMESTIC BUT POOR POTENTIAL



Hydroelectric



Biomass Ethanol

POOR RESOURCE



Geothermal

POOR RESOURCE



Wind



Nuclear



COAL



RICH RESOURCES FOR POWER PLANTS

**FOR TURKEY:
WITHIN THE PHILOSOPHY OF «VISION ZERO»
IT IS POSSIBLE TO ACHIEVE THE HIGHEST PRODUCTIVITY
WITH ZERO ACCIDENT**



V CONCLUSION



STILL WHY?

DOMESTIC

STRATEGIC

PREVENTS IMPORT

CHEAP



CONCLUSION





IS POSSIBLE!...

**THANKS FOR YOUR PATIENT!
WISH U A WONDERFUL CONGRESS...**

Contact Information

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