



TURKISH ELECTRICITY TRANSMISSION CORPORATION

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Head of Planning and Investment Management Department

TEİAŞ

2025 PERSPECTIVE

75.774,69 KM Transmission Line

75.067,94 KM Overhead

675,14 KM Cable

31,61 KM Submarine Cable

121,4 GW

Installed Capacity

%61 Renewable

~ **344 TWh**

Generated Energy (2024)

1.503 Substations

804 Owned by TEİAŞ

~ **343 TWh**

Consumption (2024)

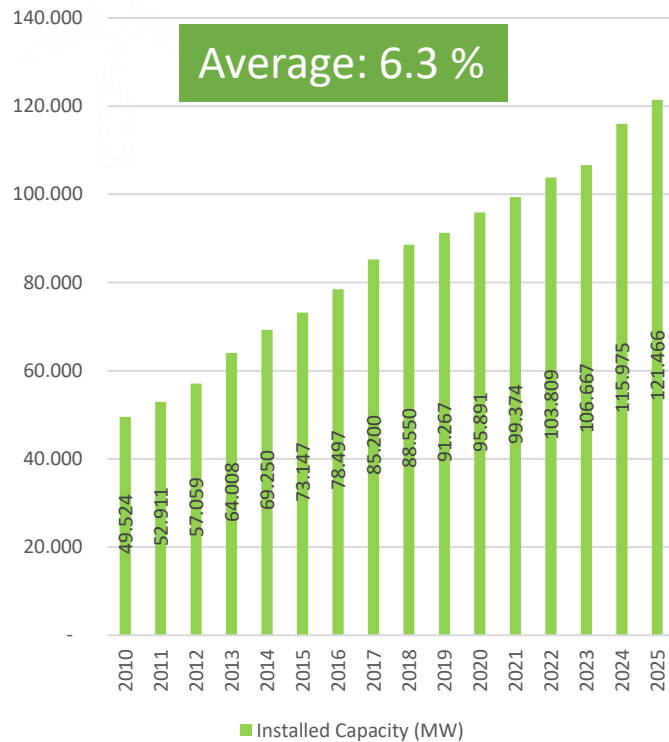
17.529 Personnel

7.721 TEİAŞ






9.808 Service Procurement

%1,9

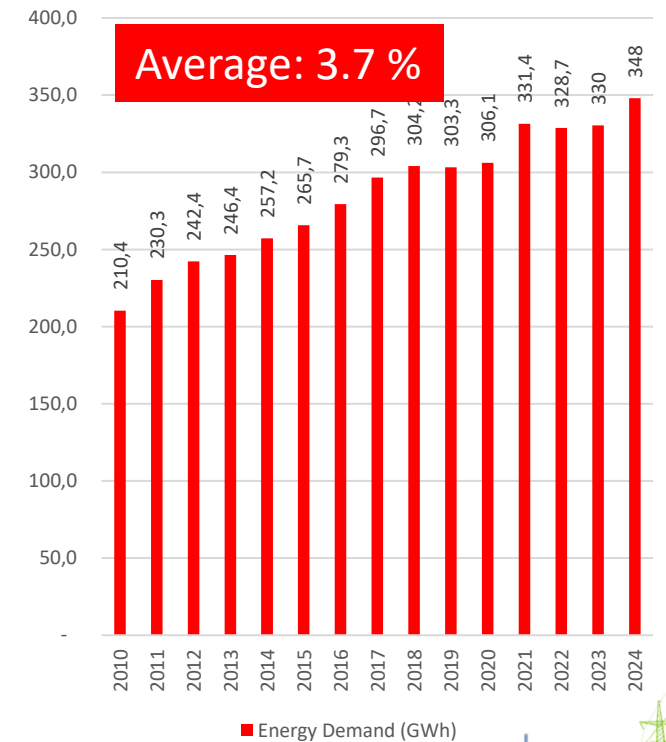
Transmission losses
(2024)

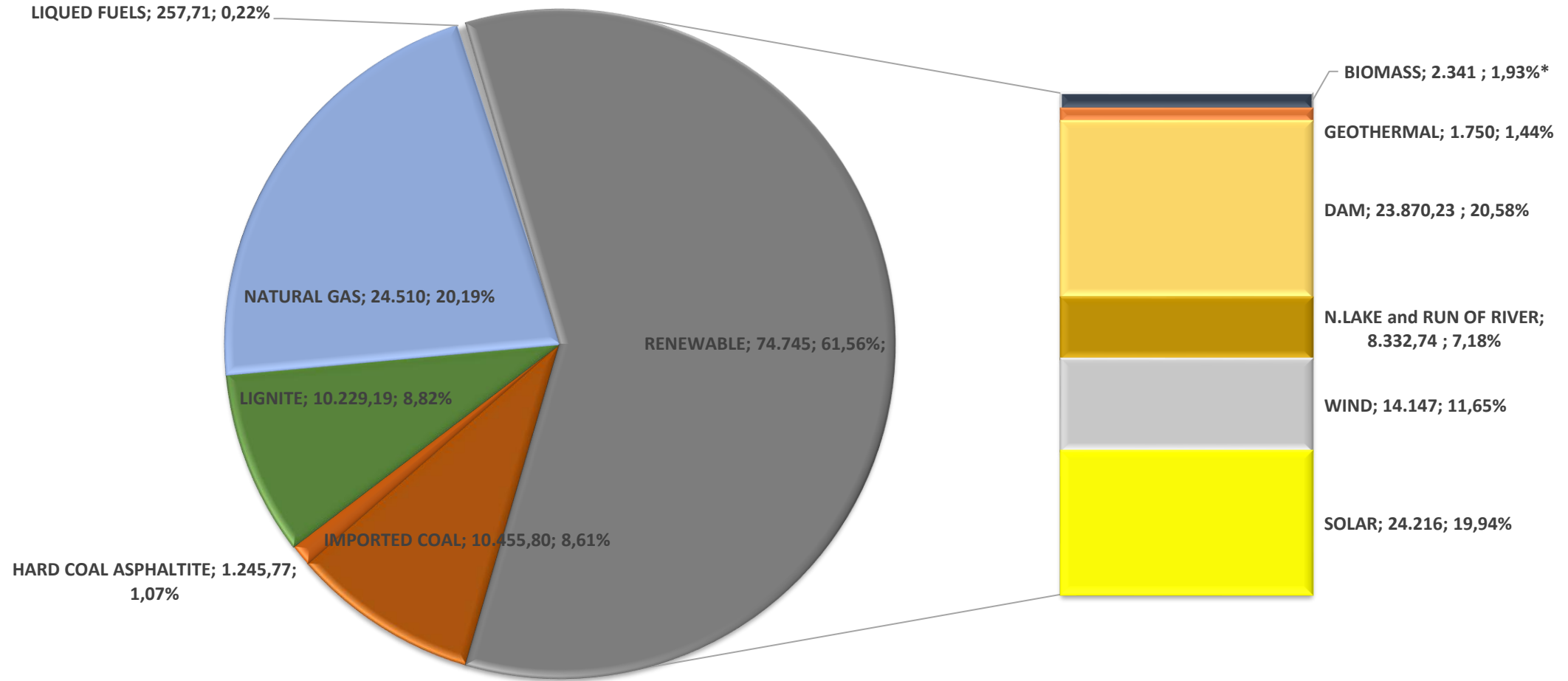


TEİAŞ, as transmission system operator, has a crucial role for the electricity value chain

-  To balance the system
-  To provide suitable grid infrastructure for renewable generation
-  To make necessary investments for installed capacity increase
-  To enable grid connections for generation and consumption facilities
-  To employ the new technologies for more efficient operations

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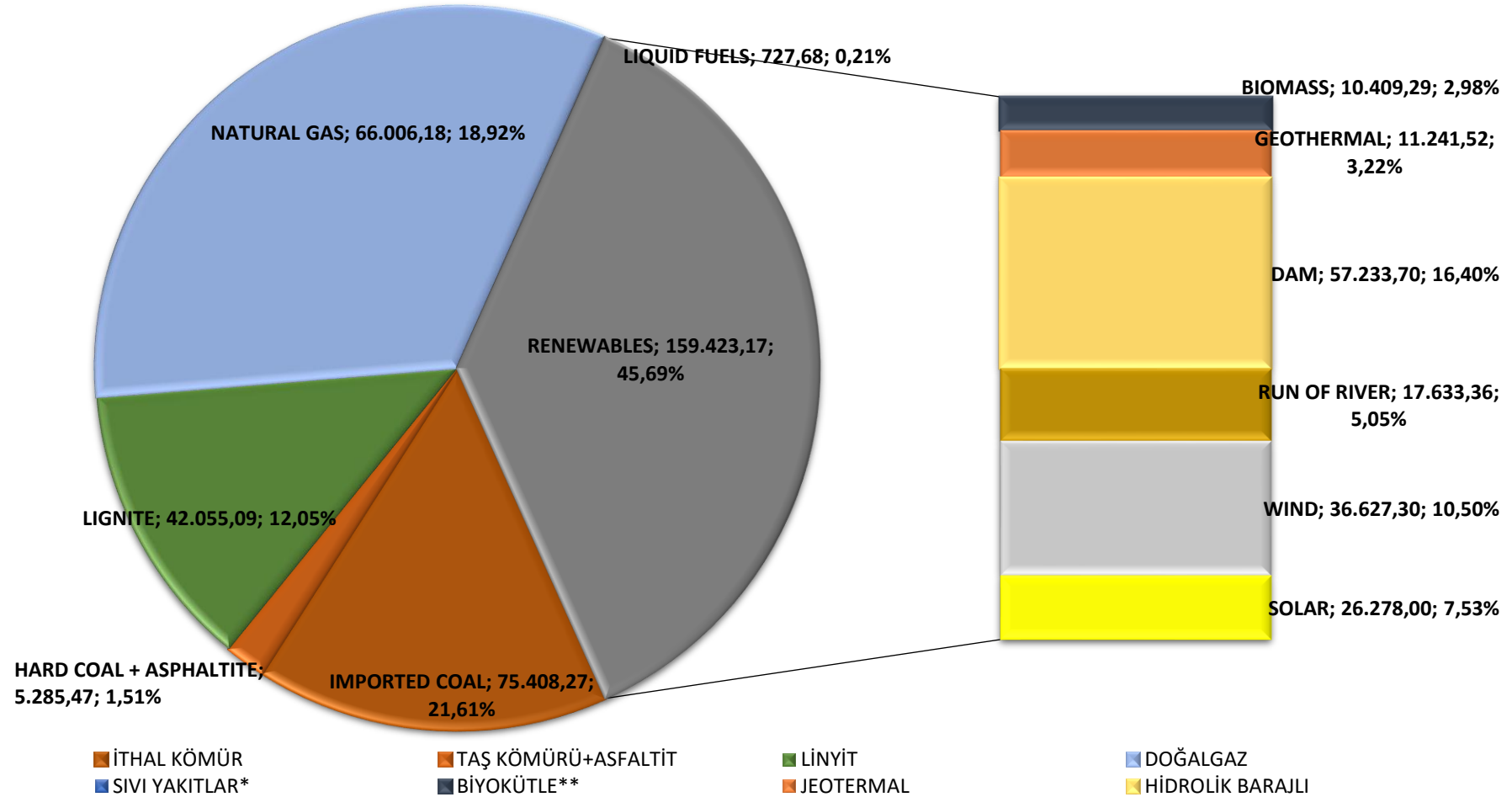


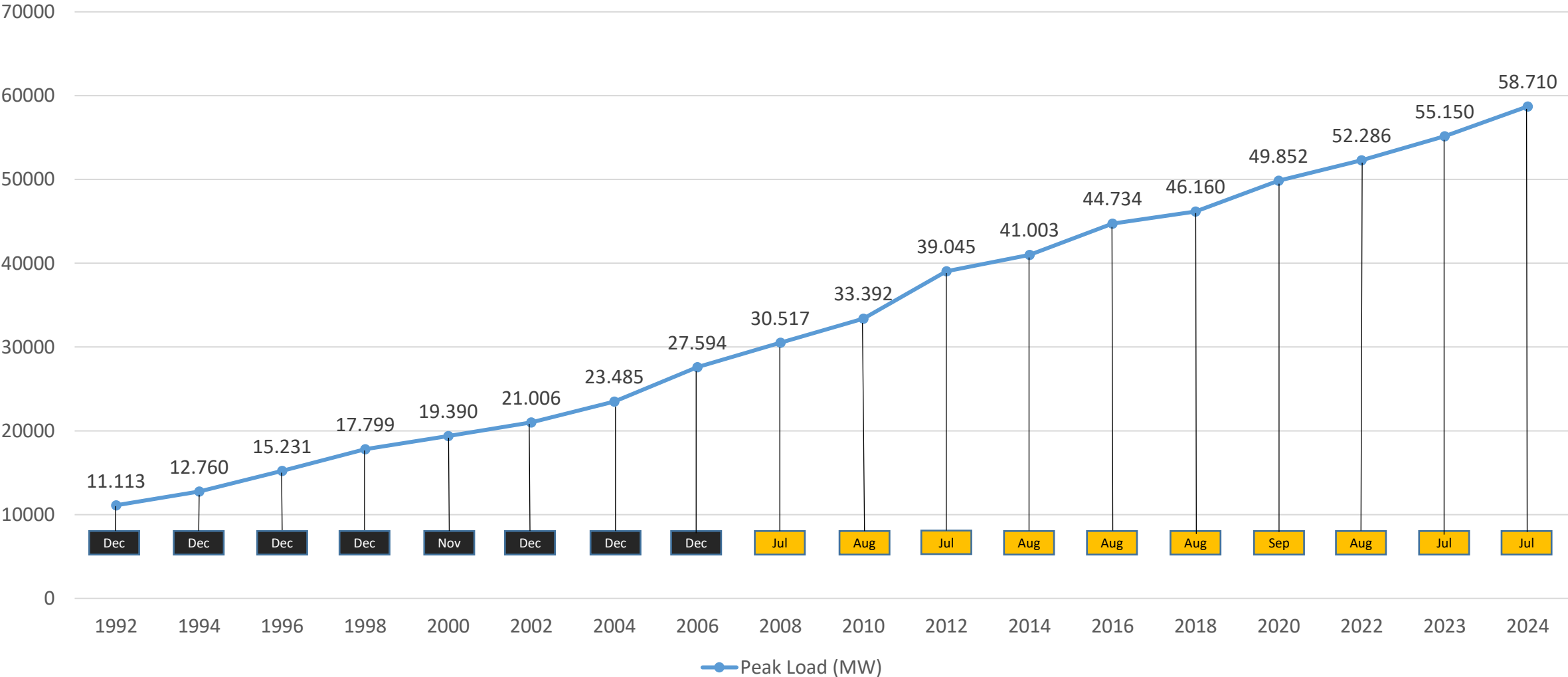


*Including Waste Heat

İTHAL KÖMÜR TAŞ KÖMÜRÜ + ASFALTİT LİNYİT DOĞALGAZ SIVI YAKITLAR * BİYOKÜTLE** JEOTERMAL HİDROLİK BARAJLI HİDROLİK AKARSU RÜZGAR GÜNEŞ



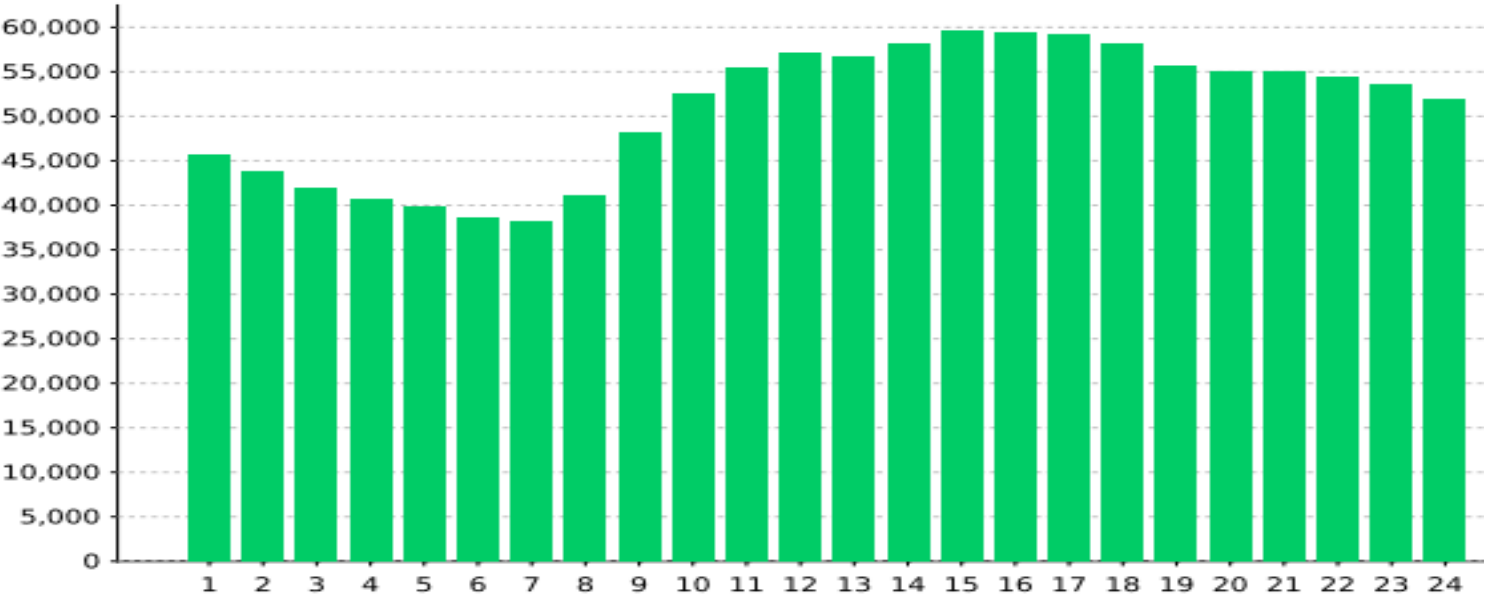






TEİAŞ

28.07.2025



DATE	HOUR	PEAK LOAD (MW)	INSTALLED POWER CAPACITY (GW)
28-07-2025	14:45	60.414	121,4





Technical Characteristics of RES

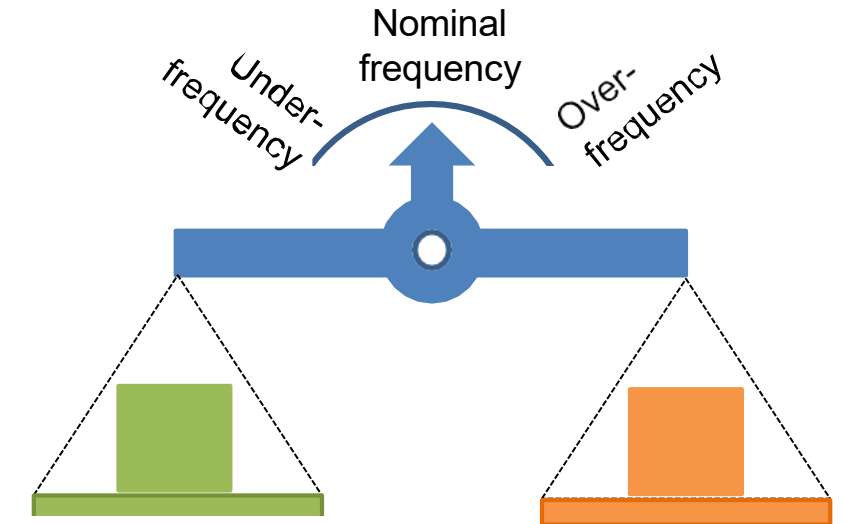
- ▶ Wind and solar are inverter-based resources and have **intermittency** and **değişken** characteristics.



The increasing penetration of RES and the continuous **retirement of conventional thermal** capacity create new operational challenges for **TSOs**:

New operational challenges for TSOs

- ❑ Reduction in system **inertia**(phasing out of the rotating masses)
- ❑ Overgeneration/**surpass generation** during midday
- ❑ Steeper evening **ramp**
- ❑ **Stability** issues(frequency,voltage and angle)
- ❑ **Congestion** management(geographical distance between generation and load)
- ❑ System **planning** with uncertainty
- ❑ Loss of the system **synchronism**(missing of the synchronous torque)



Generation and Demand Solutions

- ☐ Peaking units
- ☐ Fast-ramping **CCGT/OCGT** units
- ☐ Demand side management (Industrial load shifting and flexible manufacturing)
- ☐ Smart EV charging and **vehicle-to-grid (V2G)**
- ☐ Digital **aggregation** of distributed loads
- ☐ **New markets** (flexibility market, capacity market, inertia market etc.)

Storage and Advanced Technologies

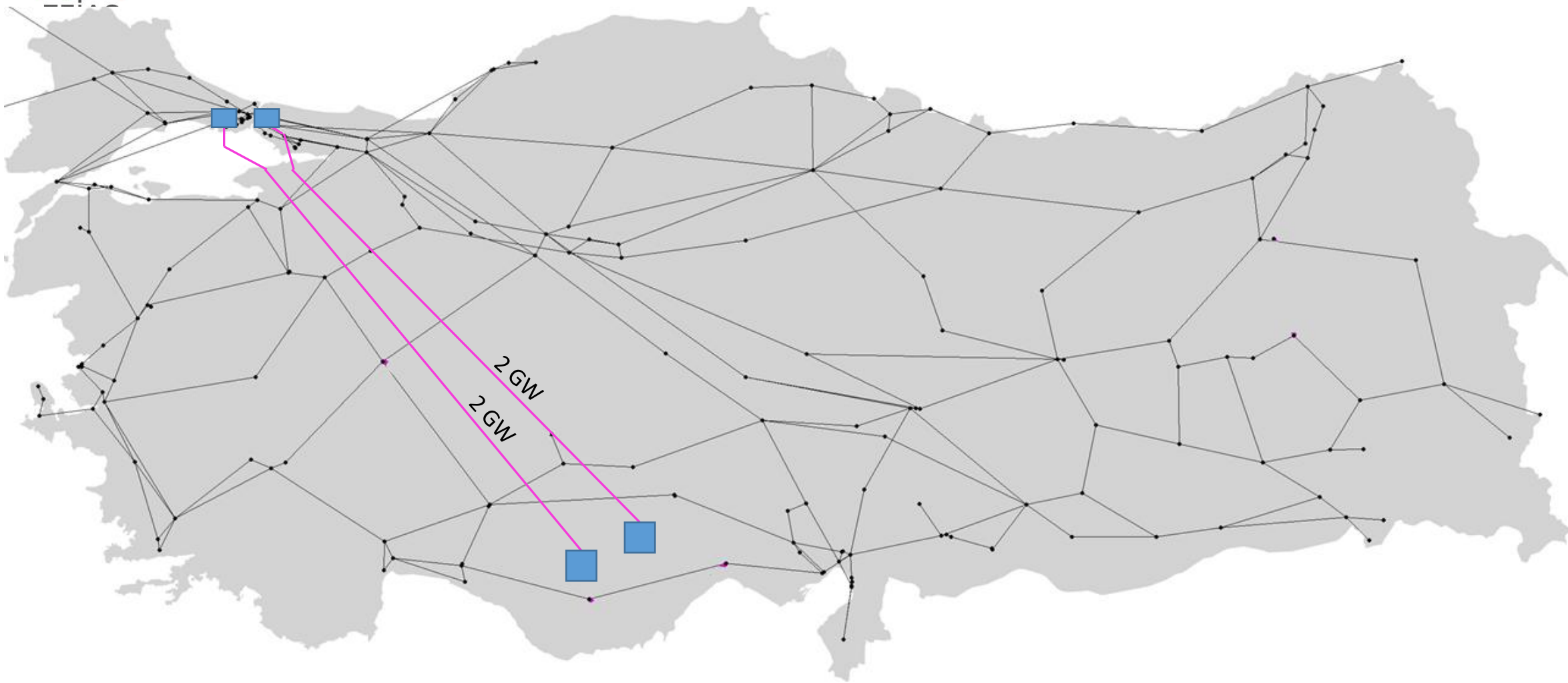
- ☐ **Battery Energy Storage Systems** (for frequency, ramping support etc.)
- ☐ **Pumped** storages
- ☐ Flywheels
- ☐ **Power to X** conversion (hydrogen, ammonia)
- ☐ Advanced forecasting and monitoring systems (PMU, WAMS etc.)

Grid Scale Solutions (HVAC & HVDC)

- ☐ Cross-border **interconnections**
 - ☐ FACTS and **STATCOM**
 - ☐ Phase Shifting **Transformers**
 - ☐ Synchronous **Condensers**
 - ☐ Dynamic **Line** Rating
 - ☐ **VSC-HVDC systems**
- Main advantages:
- Frequency support
 - Grid-forming capability
 - Virtual inertia contribution
 - Independent control of active and reactive power
 - Fault ride-through (FRT) capability
 - Reactive power support
 - Operation in the weak grid
 - Black-start functionality (system restoration after blackout)







■ Converter Station: VSC, 2x1 GW

— DC Link: 525 kV, Bipolar, 2x1GW



THANK YOU

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