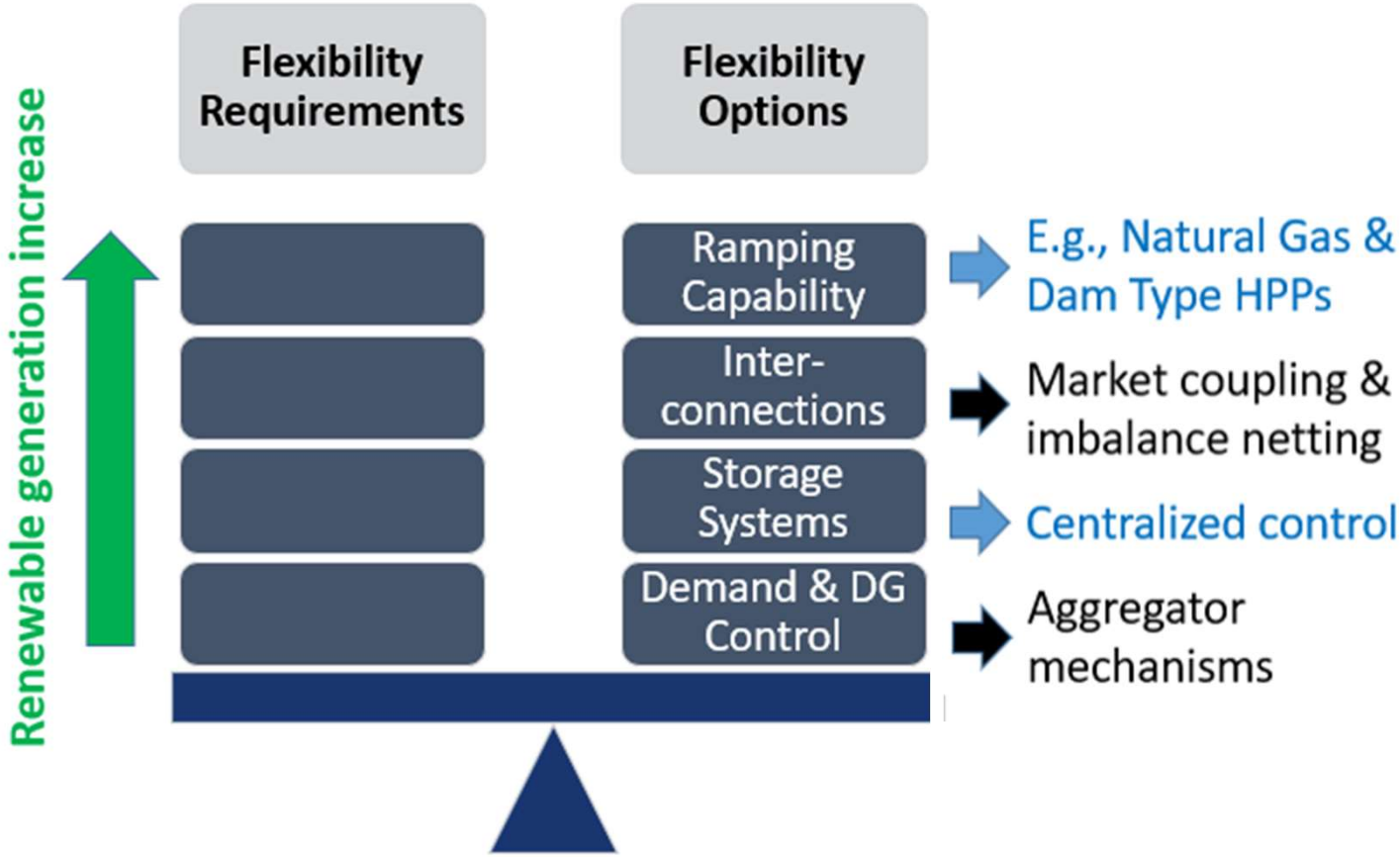
Yenilenebilir enerji hedeflerine ulaşmada şebeke esneklik çözümlerinin önemi

Doç. Dr. Osman Bülent Tör
EPRA, CEO
27 May 2021

... adds value to data ...

Şebeke esnekliğine olan ihtiyaç



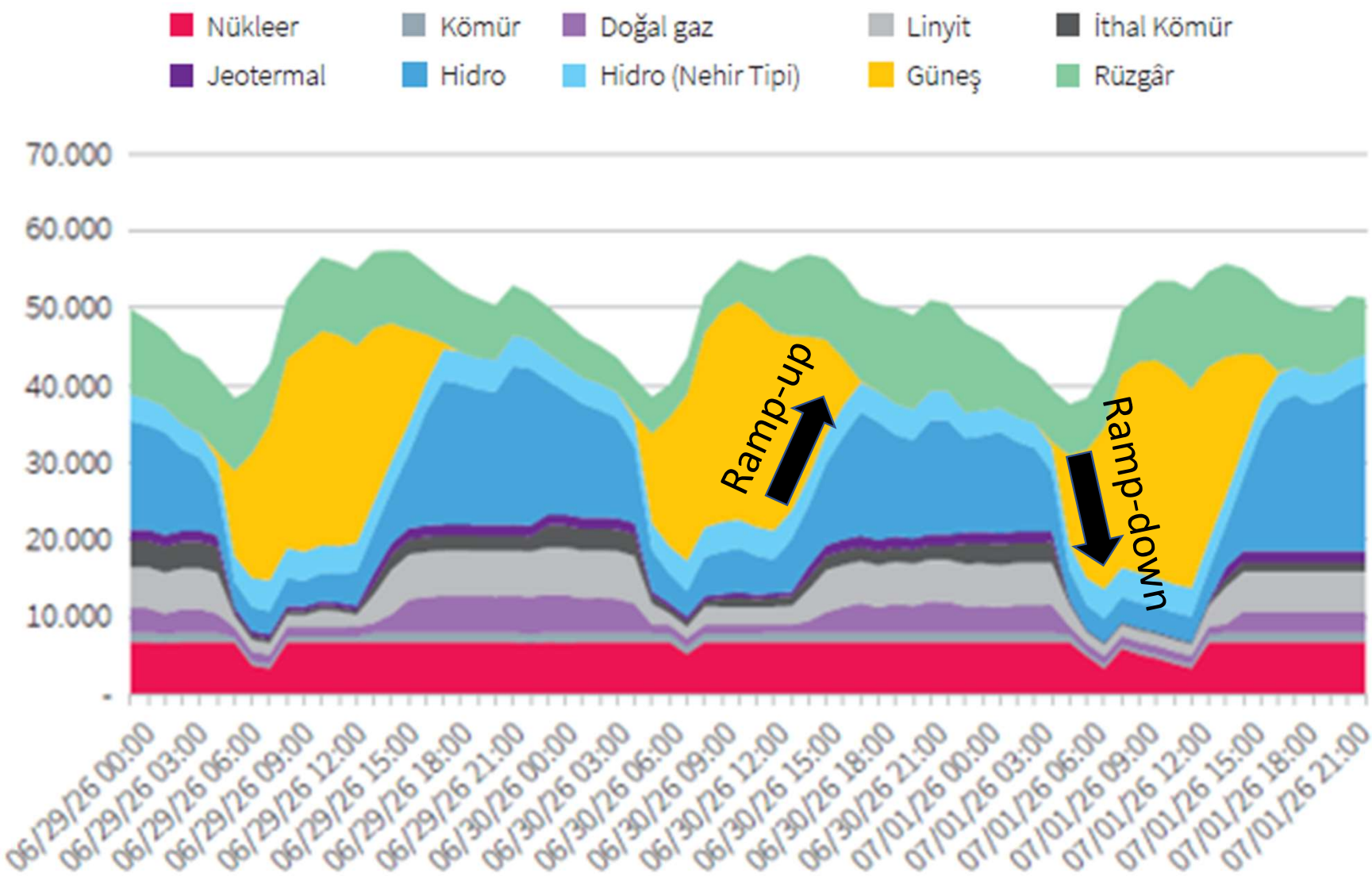
Renewable generation increase

Flexibility Requirements

Flexibility Options

- Ramping Capability → E.g., Natural Gas & Dam Type HPPs
- Inter-connections
- Storage Systems
- Demand & DG Control

Shura 2026 60 GW Scenario

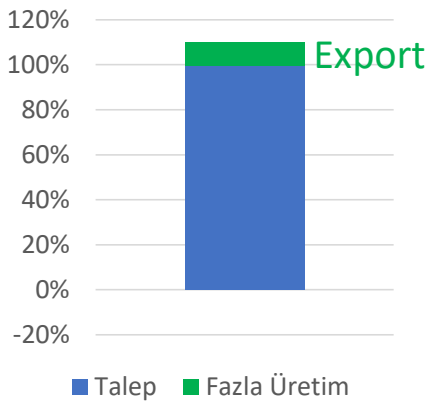


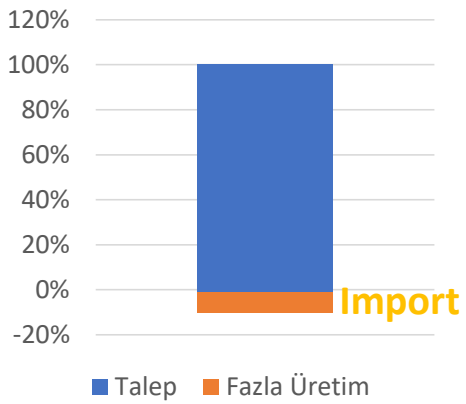
Renewable generation increase

Flexibility Requirements

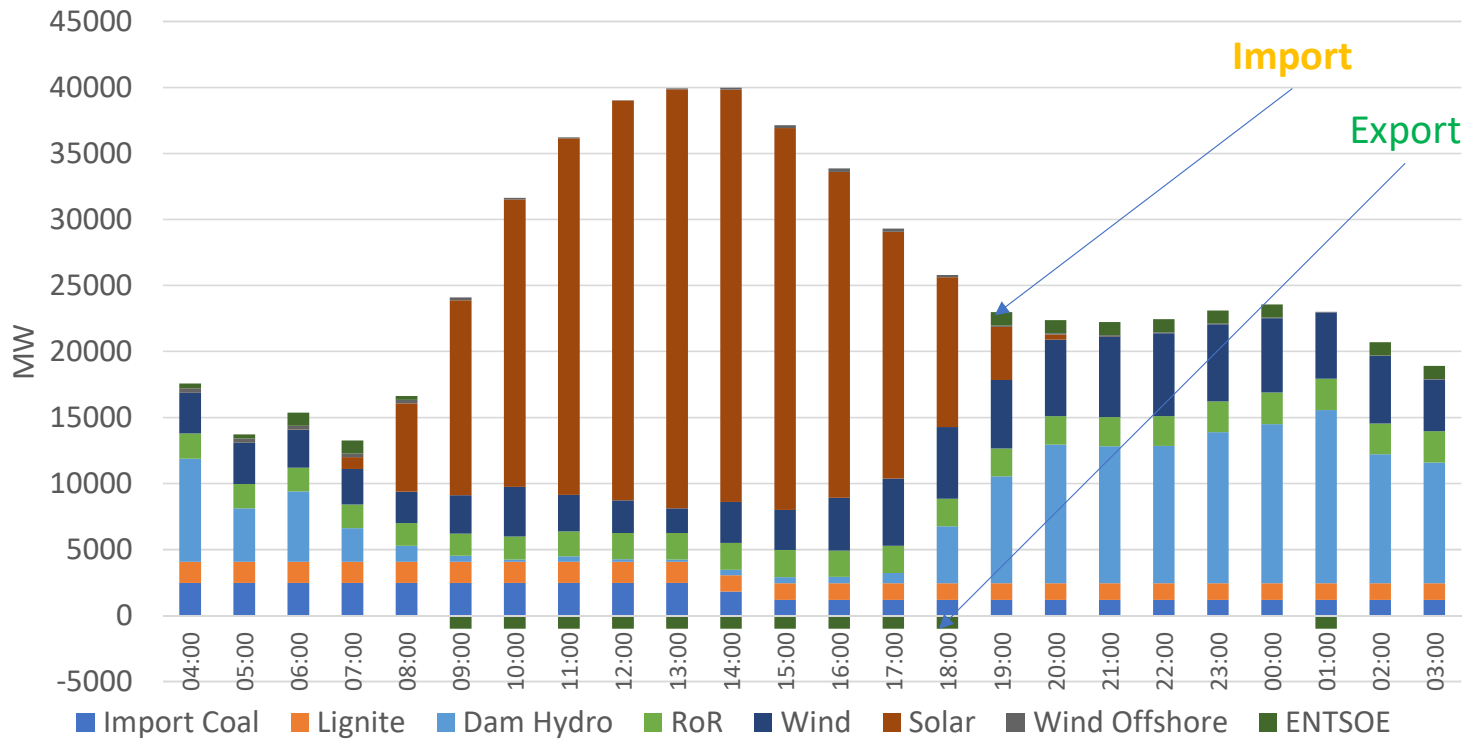
Flexibility Options

- Ramping Capability
- Inter-connections → Market coupling & imbalance netting
- Storage Systems
- Demand & DG Control





Shura Coal Phase Out Scenario 2030

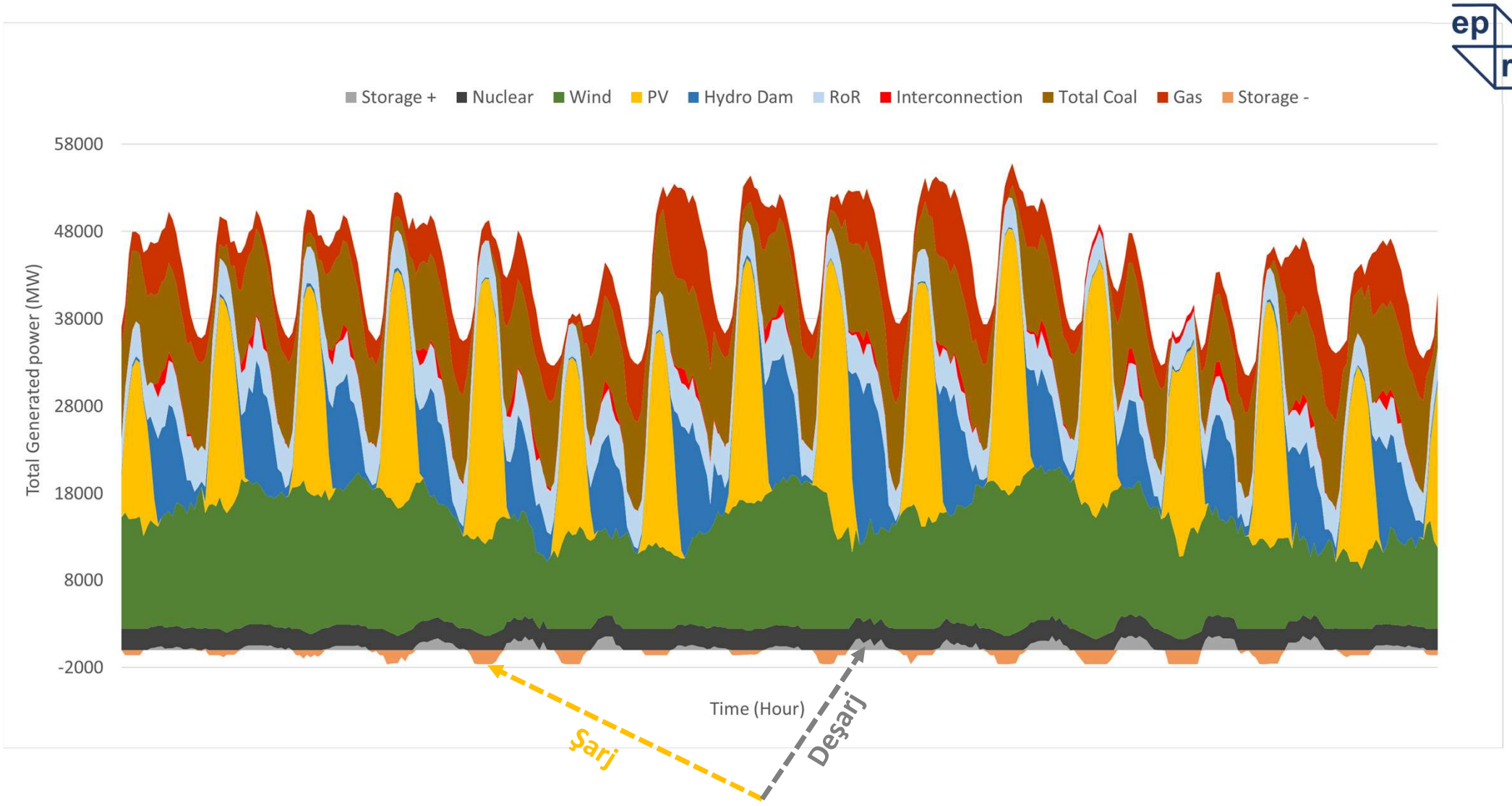


Renewable generation increase

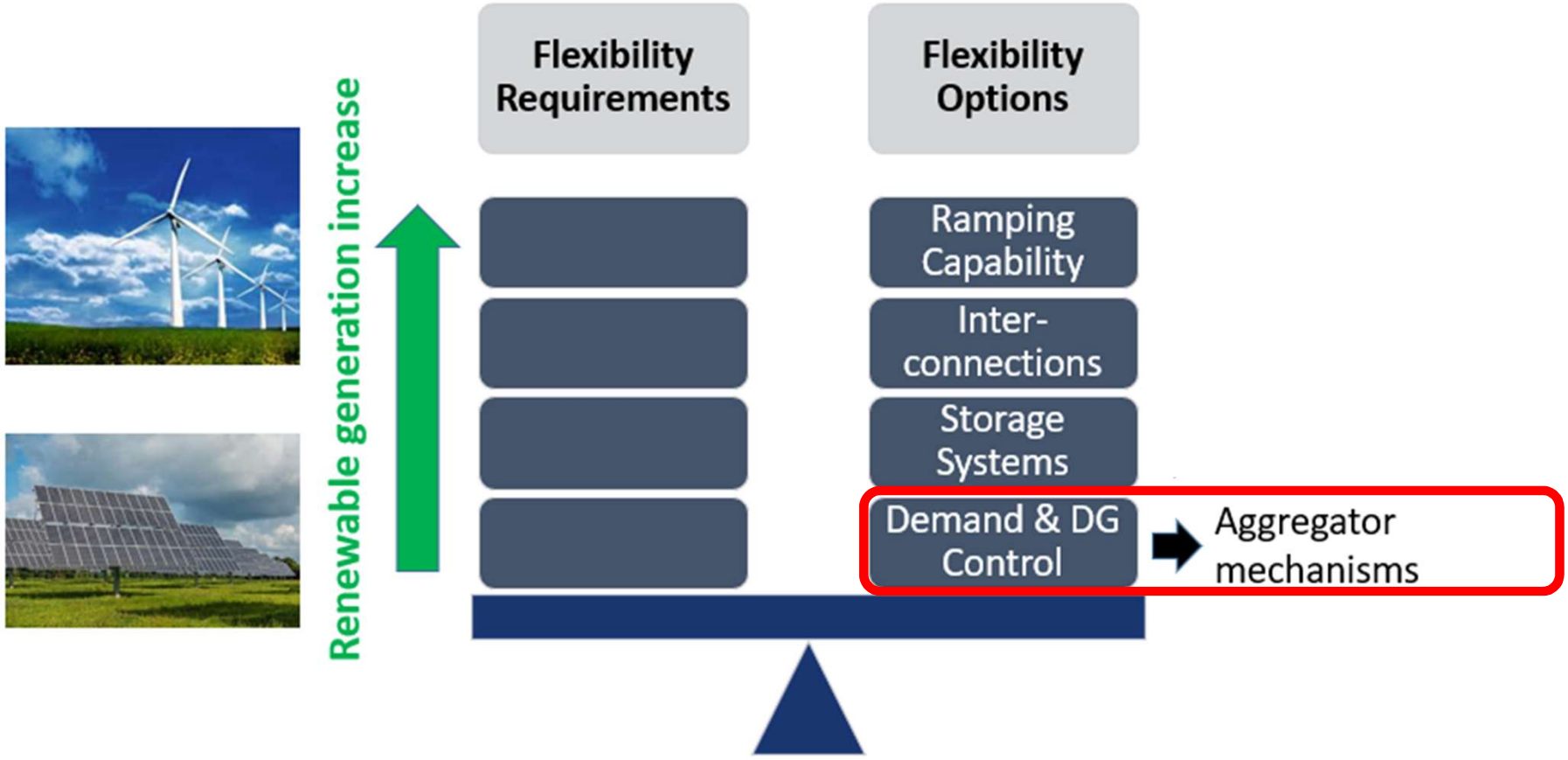
Flexibility Requirements

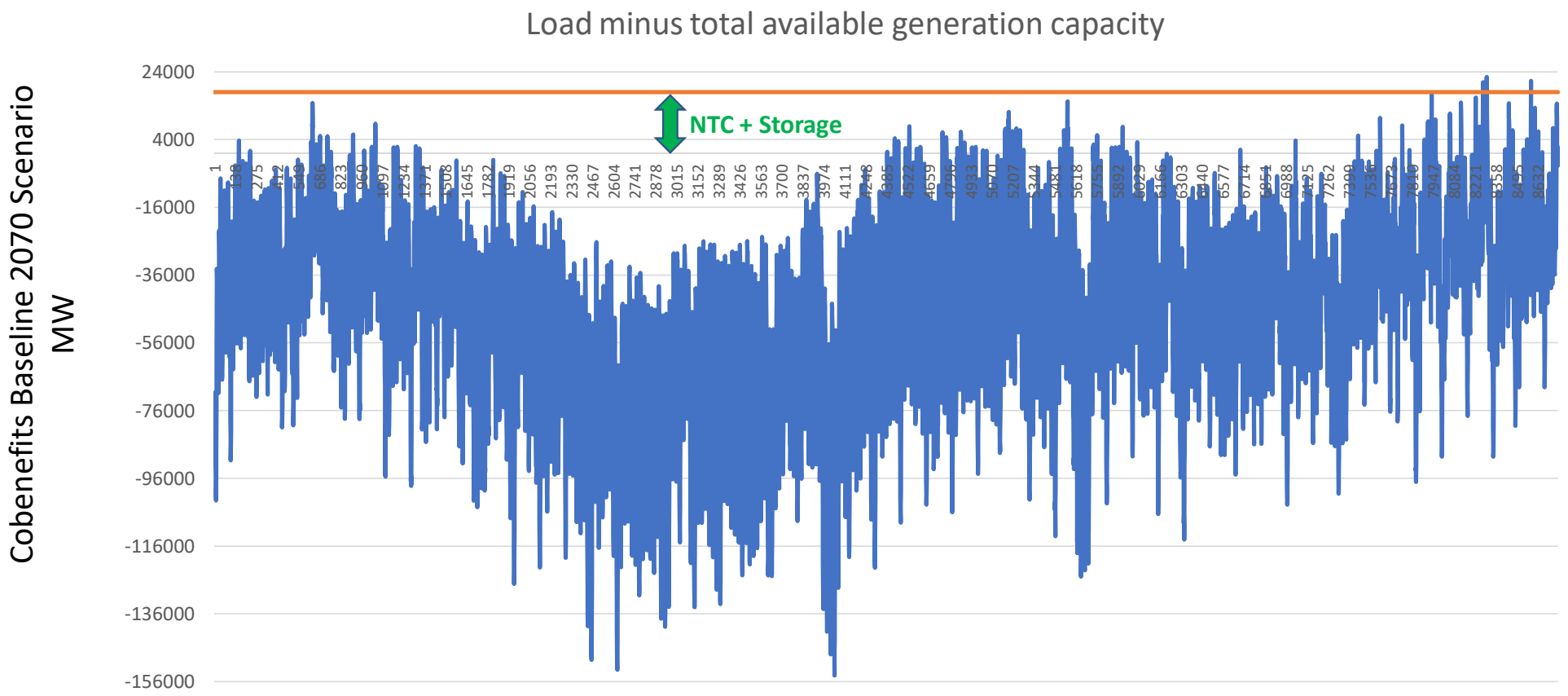
Flexibility Options

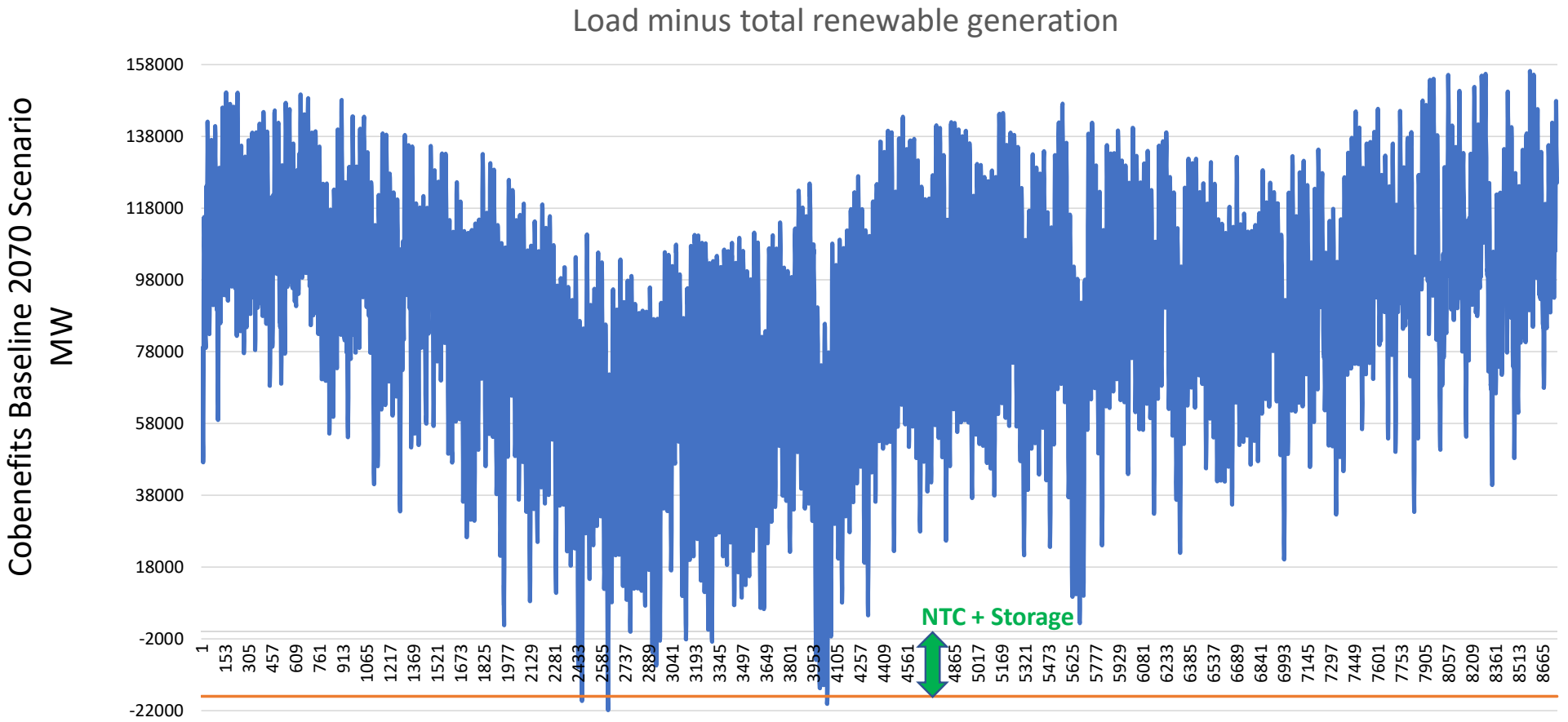
- Ramping Capability
- Inter-connections
- Storage Systems → Centralized control
- Demand & DG Control



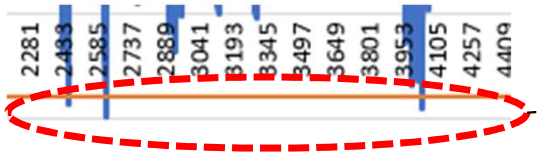
Depolama sistemleri
(600 MW centralized control)

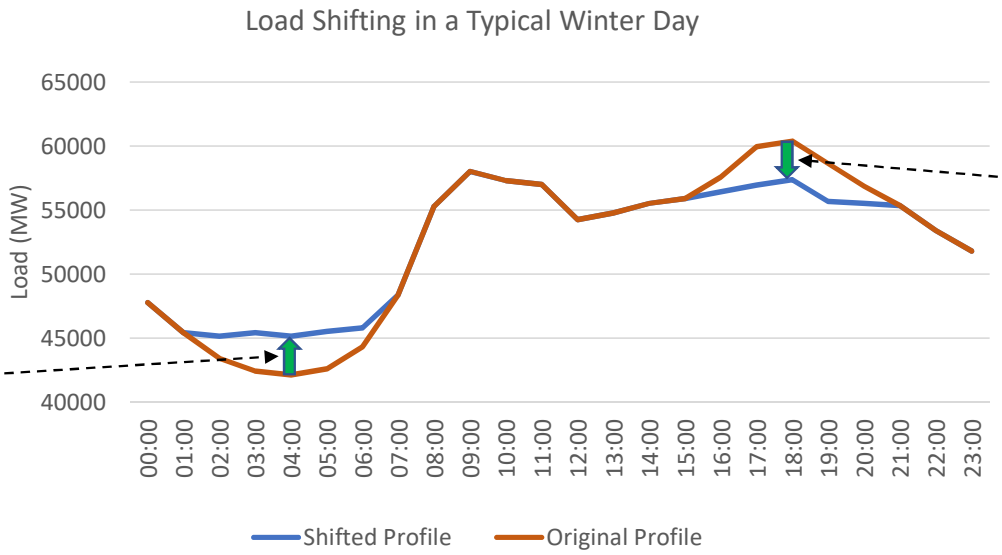

Renewable generation increase
Flexibility Requirements
Flexibility Options
Ramping Capability
Inter-connections
Storage Systems
Demand & DG Control
Aggregator mechanisms


Load minus total available generation capacity
Cobenefits Baseline 2070 Scenario
MW
NTC + Storage
24000
4000
-16000
-36000
-56000
-76000
-96000
-116000
-136000
-156000

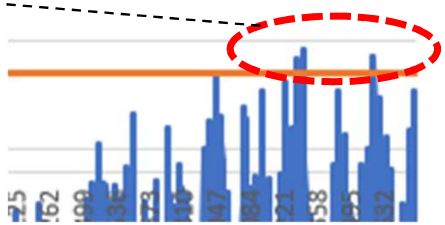

Load minus total renewable generation
Cobenefits Baseline 2070 Scenario
MW
158000
138000
118000
98000
78000
58000
38000
18000
-2000
-22000
1
153
305
457
609
761
913
1065
1217
1369
1521
1673
1825
1977
2129
2281
2433
2585
2737
2889
3041
3193
3345
3497
3649
3801
3953
4105
4257
4409
4561
4865
5017
5169
5321
5473
5625
5777
5929
6081
6233
6385
6537
6689
6841
6993
7145
7297
7449
7601
7753
7905
8057
8209
8361
8513
8665
NTC + Storage

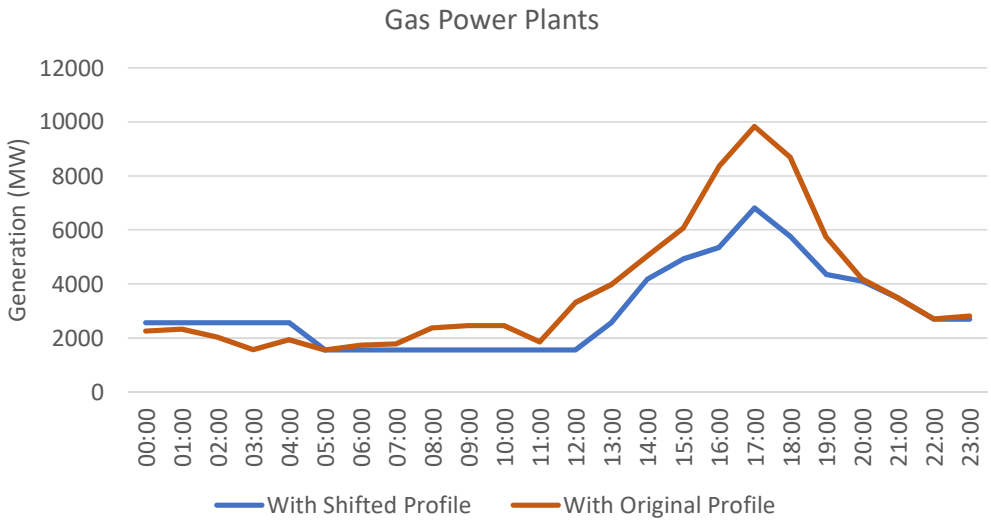
Yenilenebilir üretim kontrol





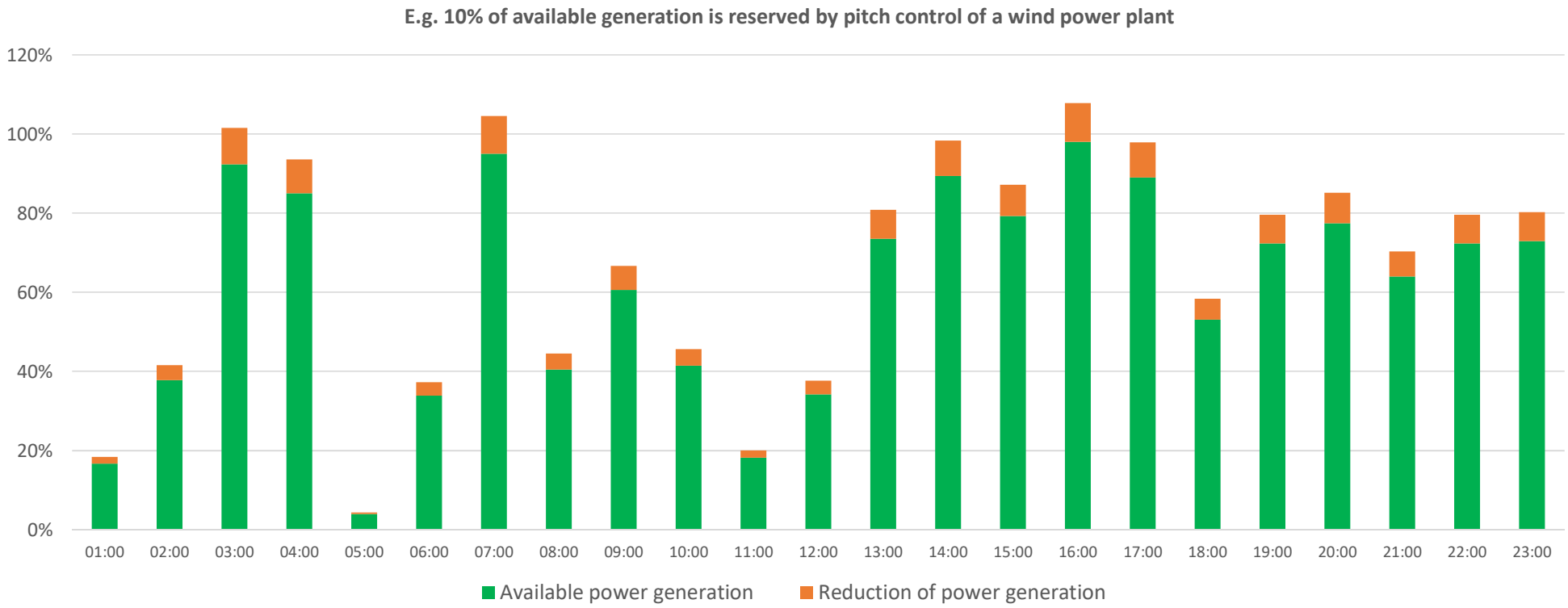
Talep kontrol



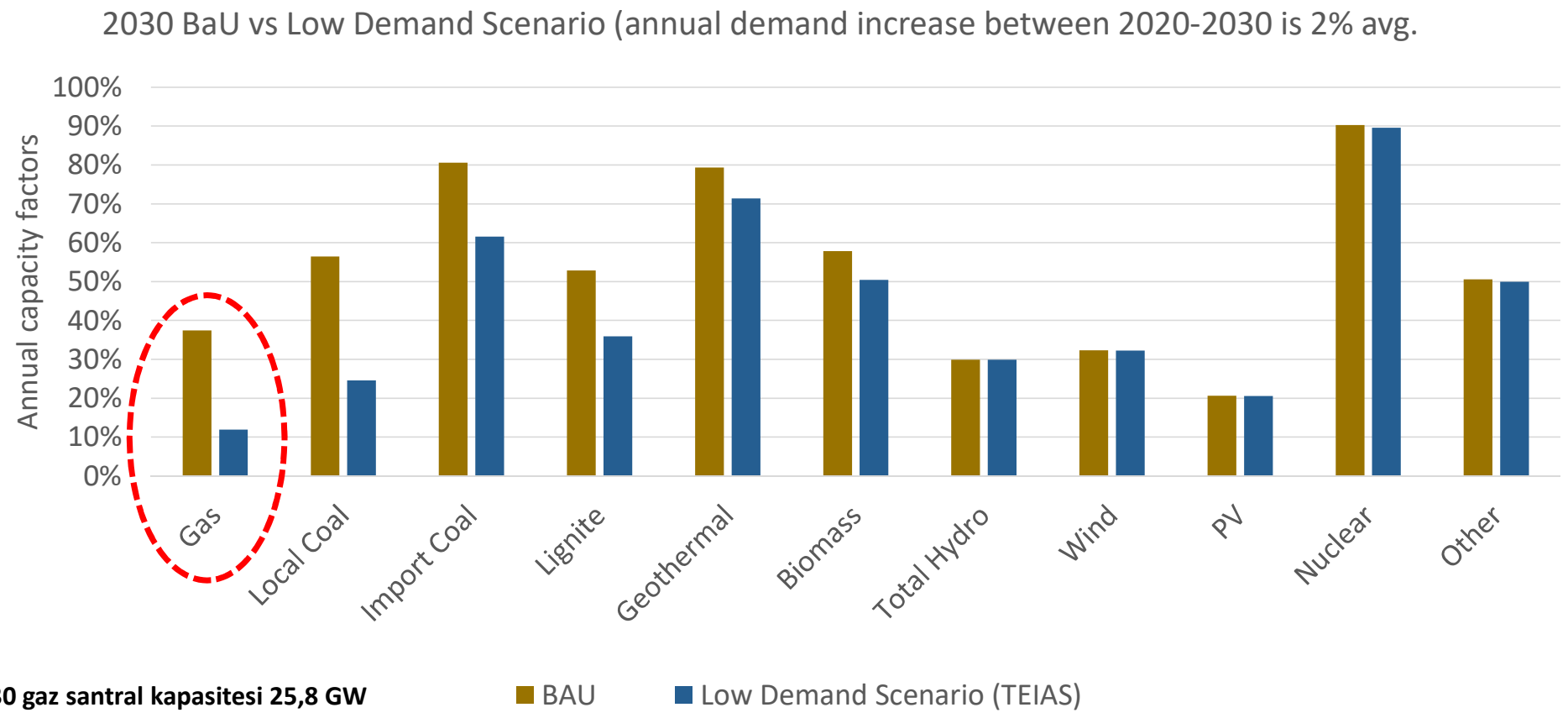


Diğer şebeke esneklik çözümleri

- Yenilenebilir santrallerden sıcak rezerv sağlanması



- Düşük kapasite faktörlü regülasyon santrallarine kapasite ödemesi



2020 & 2030 gaz santral kapasitesi 25,8 GW

Sonuçlar

- Yenilenebilir enerjiye dayalı elektrik üretim miktarının artması, şebekenin esneklik kapasitesine bağlıdır.

- Şebeke esneklik çözümlerinden beklenen yararın alınabilmesi için piyasa ve mevzuat düzenlemeleri gerekir.

- Şebeke esnekliğinin artırılmasının maliyetinin, yenilenebilir enerjiye dayalı elektrik üretim miktarının artışına dayalı kazançlar ile birlikte değerlendirilmesi gerekir.