

How was Türkiye's Record Solar Generation Balanced?

In the first part, we investigated how the maximum share of renewables progressed in the last 2 years. One interesting observation from the “maximum share graph” was how hydro played with wind and solar. In that graph, despite increasing rates of solar and solar+wind, solar+wind+hydro rate was stuck at around 74%.

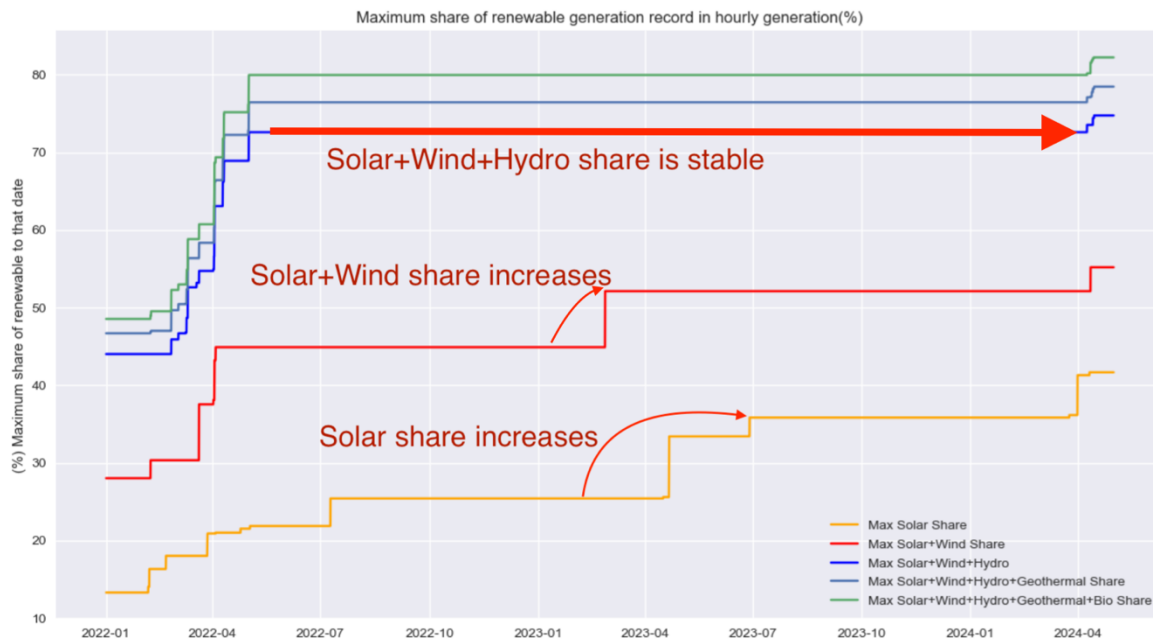


Figure 1 - Maximum share of renewables recorded in Türkiye, dates and shares

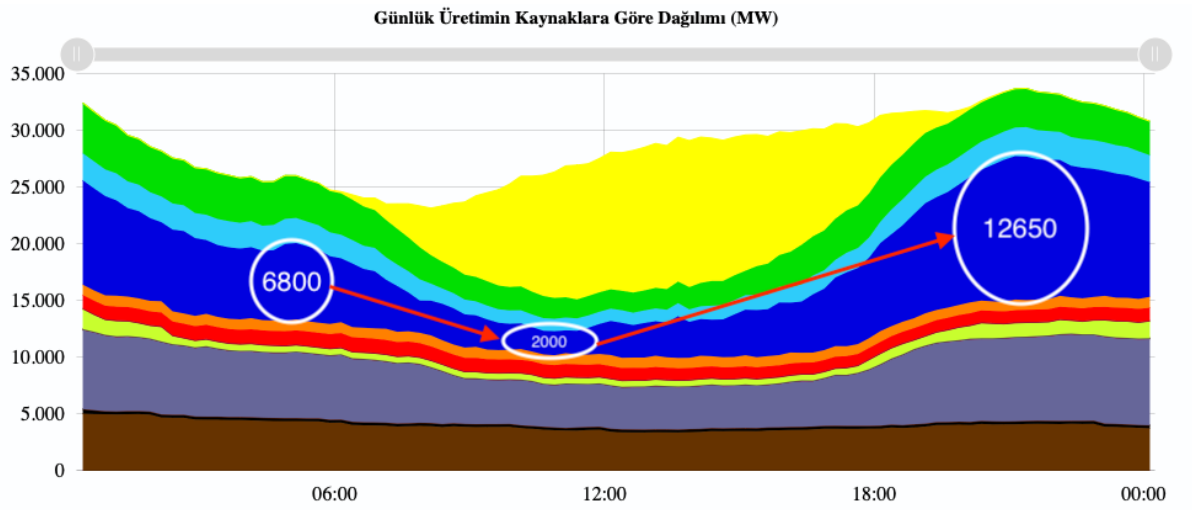
This implies the role of hydros in balancing the intermittent renewables. As the Norway's hydros act like the batteries of Europe, Turkish hydros act like a battery. The flexibility they create can be spotted easily on the 16th of June.

On the 16th of June 2024, Türkiye has seen 44% record solar share in its grid. The hidden sidekick on that day was hydro, especially reservoir hydros.

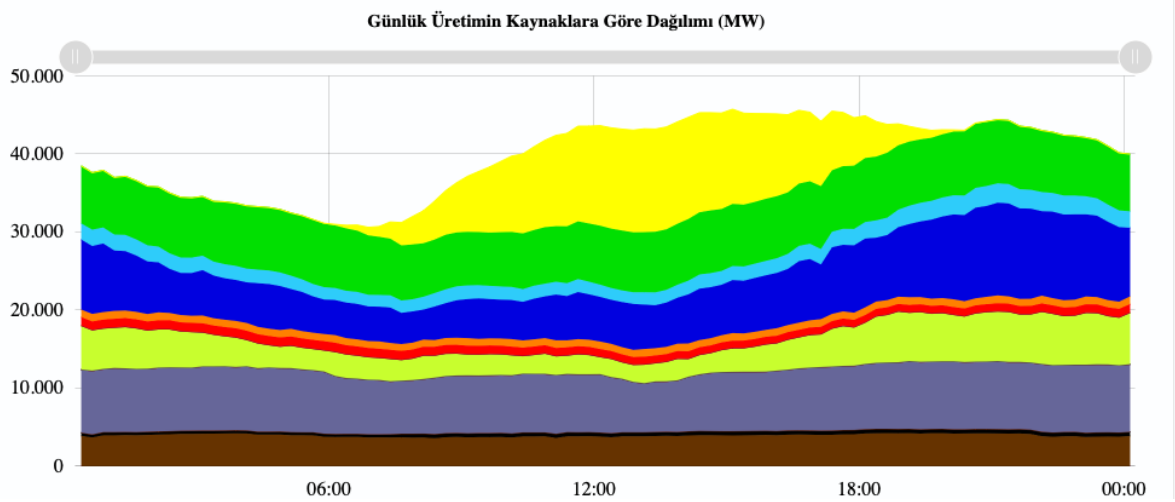
Reservoir hydros generated around

- 6800 MW at 04:45 am
- 2000 MW at 11:00 am
- 12650 MW at 21:00

One other interesting thing is the ramping up of coal power plants after 18:00(gray shaded area). 16th of June has seen one of the lowest prices in spot market. Therefore natural gas plants couldn't ramp up at that price environment. We are seeing coal entering into game after 18:00. But this may not be the case always.



Are hydros enough for solar and wind intermittency? On the 21st June 2024, this time solar increased to 13253 MW at 13:00. During that time natural gas (light grey area) was 2347 MW. At 21:15, natural gas increased to 6377 MW. An additional 4000 MWs of natural gas came to support hydro generation.



On the 21st of June, hydro has ramped up from 5000 MW to 12000 MW. An increase of 7000 MW of hydro in addition to 4000 MWs of natural gas has allowed Turkish power system to ramp up 11000 MWs to replace solar. (green area is wind)

These two days give us hints about how the Turkish system manages volatility of solar and wind. The default response is hydro then gas. But if solar cannibalizes the system prices, then probably coal will join the game.

As we will see more renewable share in the system, renewables are helping other renewables to reduce volatility. That is a win-win.

Data Sources:

EXIST Transparency Platform, seffaflik.epias.com.tr
TEİAŞ YT Data System, ytbsbilgi.teias.gov.tr