THE REASONING BEHIND CURTAILMENTS IN ELECTRICITY GENERATION FROM PHOTOVOLTAIC

Curtailments in electricity production from photovoltaic (PV) systems has gained public attention lately. Given the importance of this topic, we consider it essential to explain the reasons behind these curtailments, which play a critical role in ensuring the safe and uninterrupted operation of Cyprus's Electrical System.

The Importance of Balancing Supply and Demand

A fundamental principle of electrical systems is that, at any given moment, total electricity generation must equal total demand. If this balance is disrupted—even for a fraction of a second—the system risks collapsing, leading to widespread blackouts with severe consequences.

Recently, there has been a significant increase in the number of PV systems integrated into Cyprus's Electrical System, ranging from small rooftop residential installations to large-scale commercial projects. As part of the green transition—driven by both environmental and economic factors—the Ministry of Energy, Commerce, and Industry has introduced various subsidy schemes to encourage PV installations. Additionally, the Cyprus Energy Regulatory Authority (CERA) has been granting approvals and licenses for larger PV systems. This ongoing expansion of PV installations leads to an increasing share of electricity being generated from solar energy.

However, because Cyprus's Electrical System operates in isolation—without interconnections to other countries—there is no option to export excess energy when renewable energy production surpasses demand.

The Crucial Role of the Transmission System Operator Cyprus (TSOC)

The Transmission System Operator Cyprus (TSOC) is responsible for maintaining the balance between electricity supply and demand. This task becomes increasingly challenging during periods of low electricity consumption combined with high renewable energy generation.

As the entity in charge of ensuring the safe operation of Cyprus's Electrical System, the TSOC continuously assesses the maximum feasible renewable energy generation. When conditions require it—such as favorable weather conditions leading to high solar output and exceptionally low electricity demand—the TSOC issues curtailment orders to the Distribution System Operator (DSO - EAC). The DSO then distributes these orders across the PV systems. Curtailments are applied in a prioritized manner, starting with the larger PV installations. If further reductions are needed, smaller PV systems, including residential installations, may also be curtailed.

Challenges and Future Solutions

Unfortunately, as PV penetration in the grid continues to grow, curtailments of renewable electricity will also inevitably increase. However, large-scale energy storage solutions could provide alternative ways to store and manage solar energy, making it available when immediate consumption is not possible, as a result electricity cuts form RES will be reduced.

Additionally, the planned interconnection of Cyprus's Electrical System with other countries is expected to significantly improve the situation, alleviating many of the challenges posed by increased solar power generation.