



Chart of the Week #2023-35

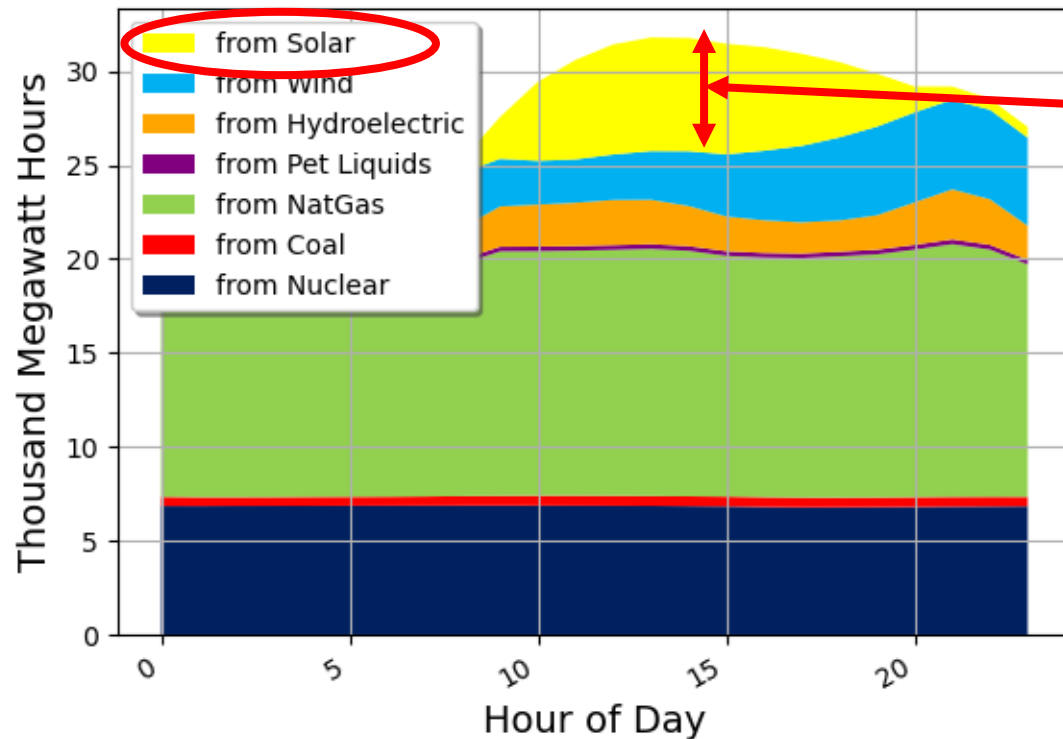
The Spanish Duck Curve: Evolution of Spain's August Electricity Generation Resource Mix — 2019-2023



Max Pyziur
September 13, 2023
Washington, DC

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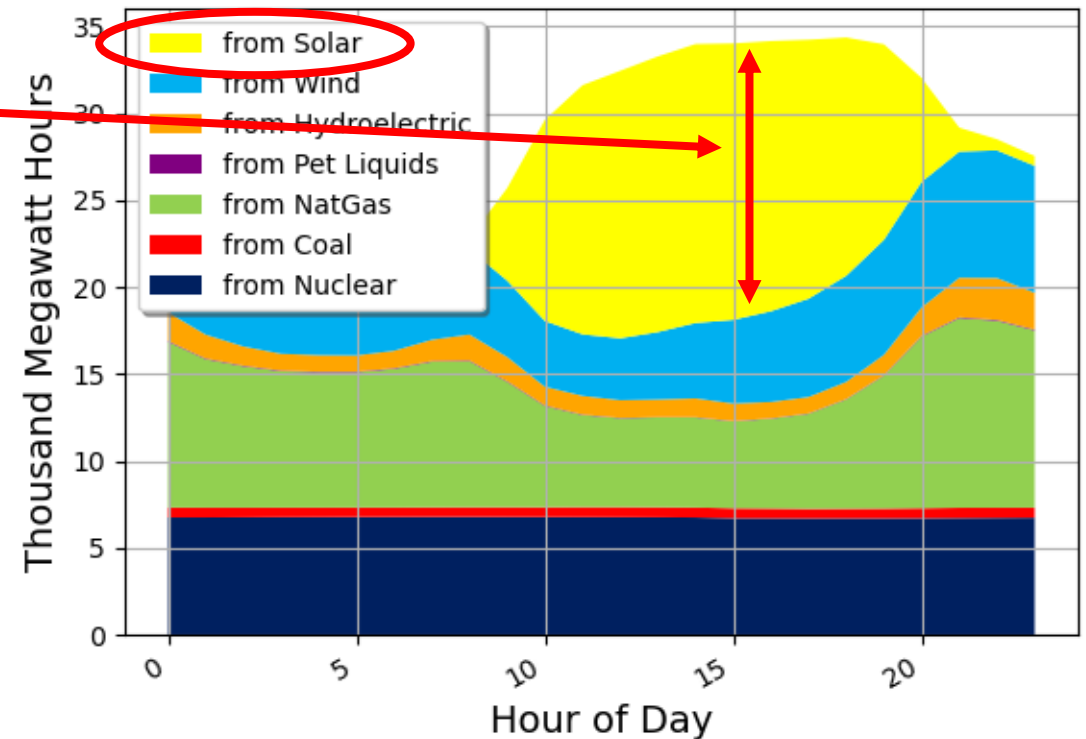
Spain Average Hourly Electricity Production: from
08/01/2019 to 08/31/2019



Analysis based on Hourly ENTSO-E Data

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- Increasing reliance on the generation from utility-scale solar photovoltaic systems by state-level and national grids has resulted in a phenomenon known as the "Duck Curve."
- The Duck Curve designation was first noticeable and applied to the phenomenon in California. During peak midday summer generation, a distinctive bulge was graphed by solar electricity production that strongly displaced generation from other sources such as natural gas.
- With the increasing generation of solar electricity in countries such as Spain, the Duck Curve phenomenon can be seen there also.
- With the drop off in solar generation in the late afternoon and the increase in evening power demand, other generating resources are required to accommodate demand. During August 2023, Spain's grid required a ramp (increase in generation) of almost 6 thousand megawatts (MWs) from 4pm to 9pm (20 MWs per minute).
- This can only be accommodated by natural gas generation, which has the capability of ramping at 40 MWs per minute. Other sources such as coal and nuclear can only ramp at a rate of 4 MWs per minute.
- This slide deck is available at: <https://eprinc.org/chart-of-the-week/>
- For more information on this chart, please contact Max Pyziur (maxp@eprinc.org).