

17-21 JUNE 2019  
**EU SUSTAINABLE ENERGY WEEK**  
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# TILOS Project

The battery based HPS in Tilos Island

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# TILOS Project - overview

- TILOS Project is the first ever implemented Hybrid Power Station (HPS) in Europe that combines wind, solar power and a battery storage system through an advanced control system, as well as, operates in a day ahead scheduling through a long-term PPA and delivers electricity to the end users in the island.
- The island of Tilos is located in the South-East Aegean Sea, belonging to the Dodecanese Islands.
- TILOS Project is under the EU HORIZON 2020. Eunice is the owner and operator of the HPS.
- Has been awarded the ENERGY ISLANDS and CITIZENS award in #EUSEW17



# TILOS Project - Location



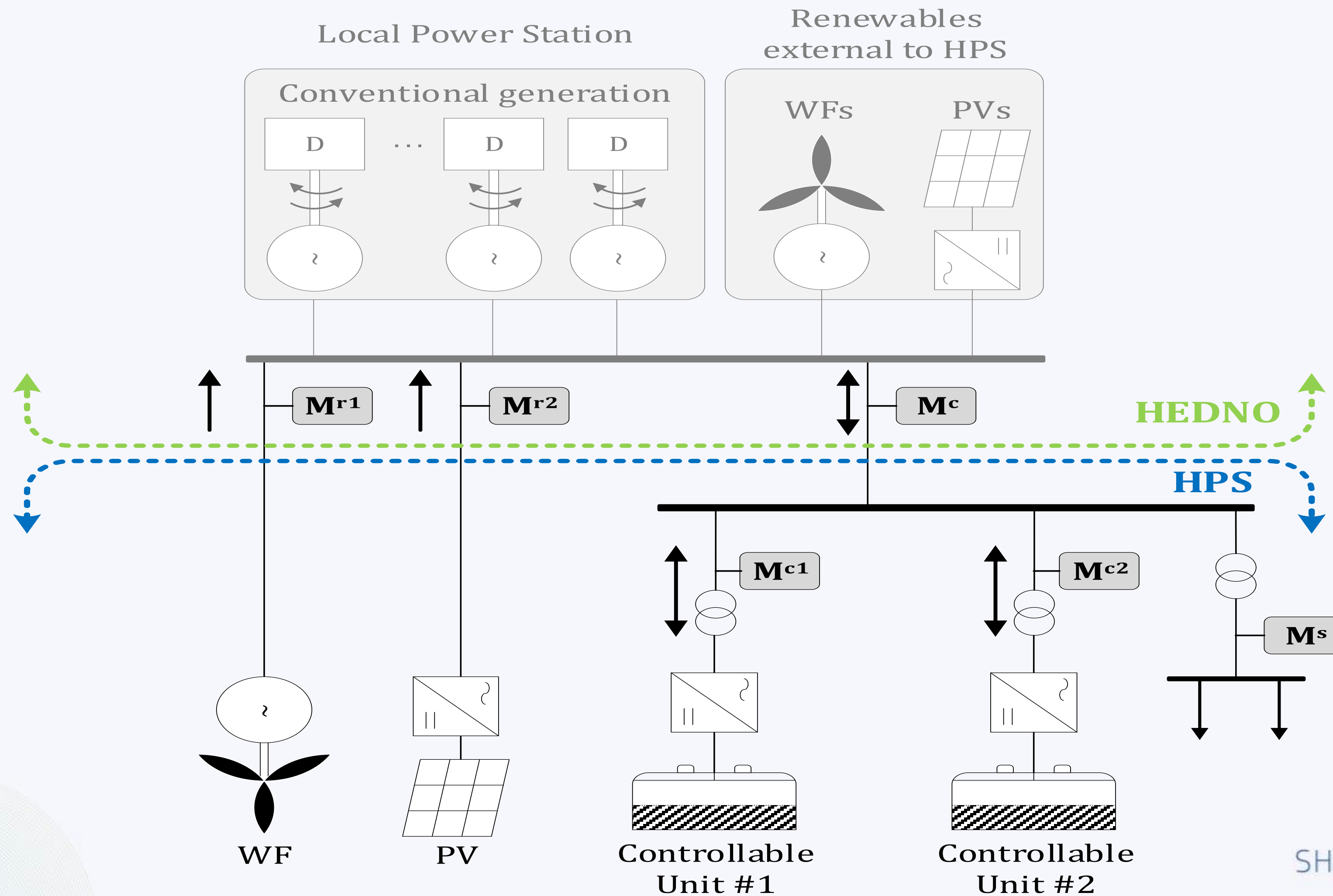
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# TILOS – Technical Overview

TILOS HPS' main components:

- An advanced battery storage of 2.8 MWh total energy capacity – Sodium-Nickel technology
- A medium-sized wind turbine of nominal capacity of 800kW
- A PV Park of 160 kW nominal capacity

# TILOS Project's Main Components



# Significant Achieved Results

- In September 2018, Tilos was completed, connected and fully operational. **Since February 2019**, it has been effectively operating by following the 24 hour day ahead energy scheduling.
- Average monthly penetration of renewables between December 2018 and March 2019 was 72%, being highest 93% in December 2018
- In several cases, daily penetration exceeded 100% indicating energy exports to Nisyros Island.

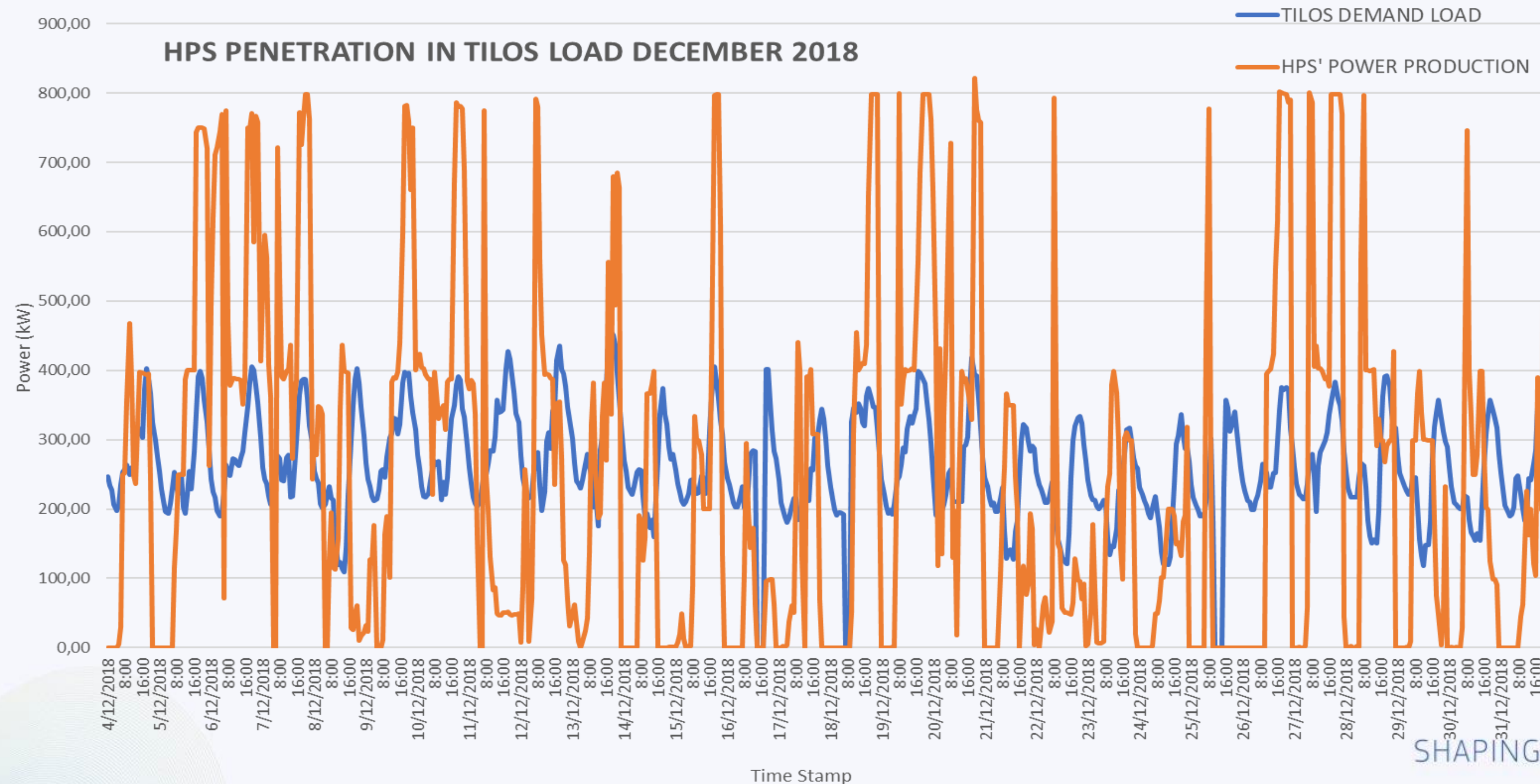
# Significant Achieved Results

Month	Load Demand (MWh)	Average Penetration (%)	max. Daily Penetration (%)
<b>September 2018</b> (14.09.18-30.09.18)	164,600	24.14%	46,14% on 26.09.2018
<b>October 2018</b>	203,800	34.53%	132,10% on 25.10.2018
<b>November 2018</b>	122,000	59.11%	201,75% on 23.11.2018
<b>December 2018</b>	174,263	<b>93.04%</b>	193,58% on 06.12.2018
<b>January 2019</b>	195,422	74.01%	258,02% on 30.01.19
<b>February 2019</b>	185,399	65,26%	293,2% on 28.02.19
<b>March 2019</b>	173,482	55,19%	293,5% on 16.03.19



# Significant Achieved Results

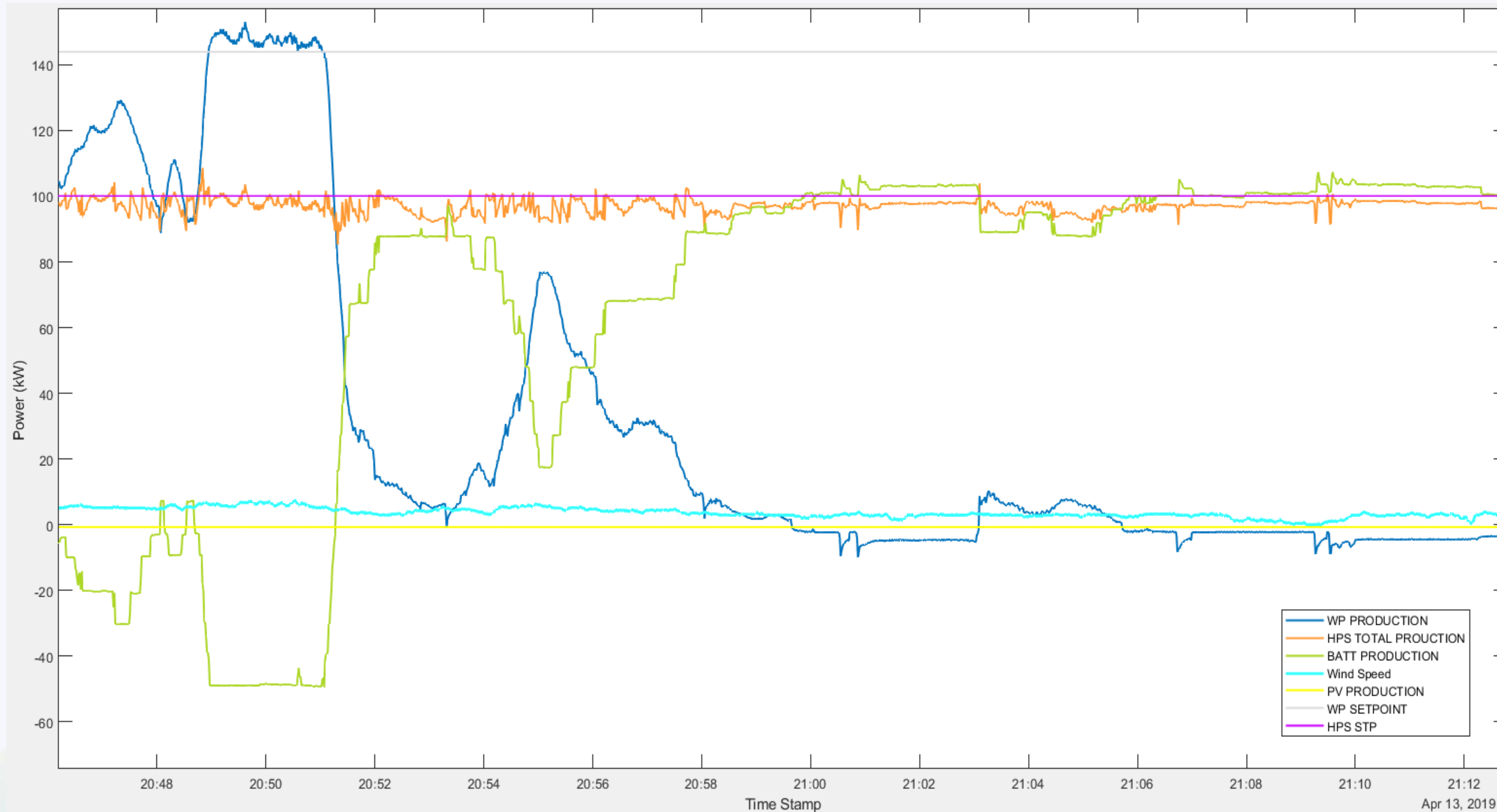
- Contribution of the HPS to the local consumption (December of 2018)



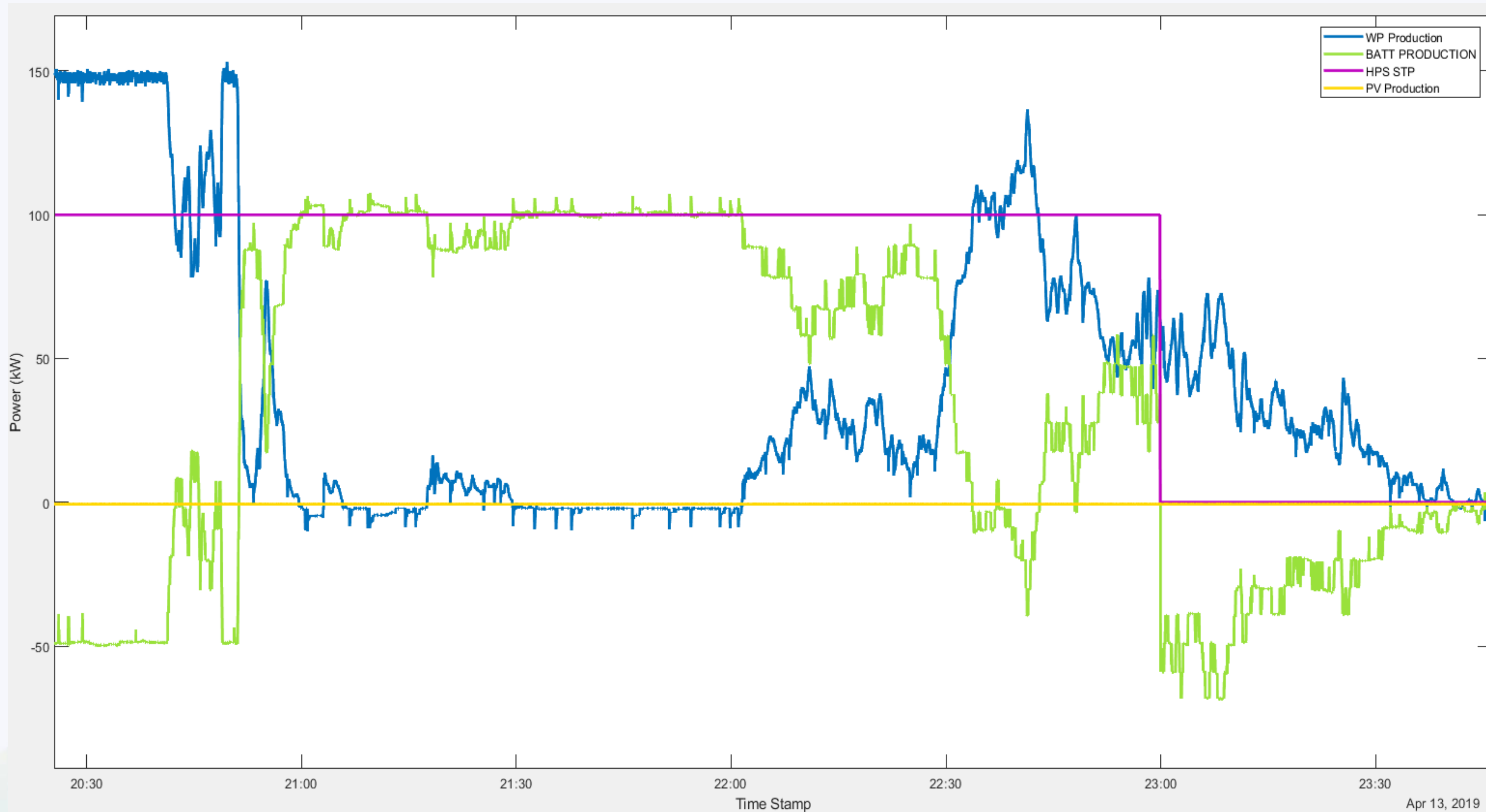
# Battery Storage System's Vital Role

The capability of the battery storage system to essentially support the increased penetration of the RES and ensure the reliable operation of the HPS

# Battery Storage System's Vital Role



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# Battery Storage System's Vital Role

- The battery storage system also offers ancillary services to the grid through the **PQ**, **QU** and **P-f control modes** that have been integrated to its inverter's power conversion system. Moreover, through these implemented control methods, voltage regulation, primary frequency regulation and constant power output control are ensured during the operation of the HPS and therefore the reliable real time operation of the HPS is ensured as well.



Thank you

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