

Increasing the Value of Offshore Wind by Integrating On-board Energy Storage

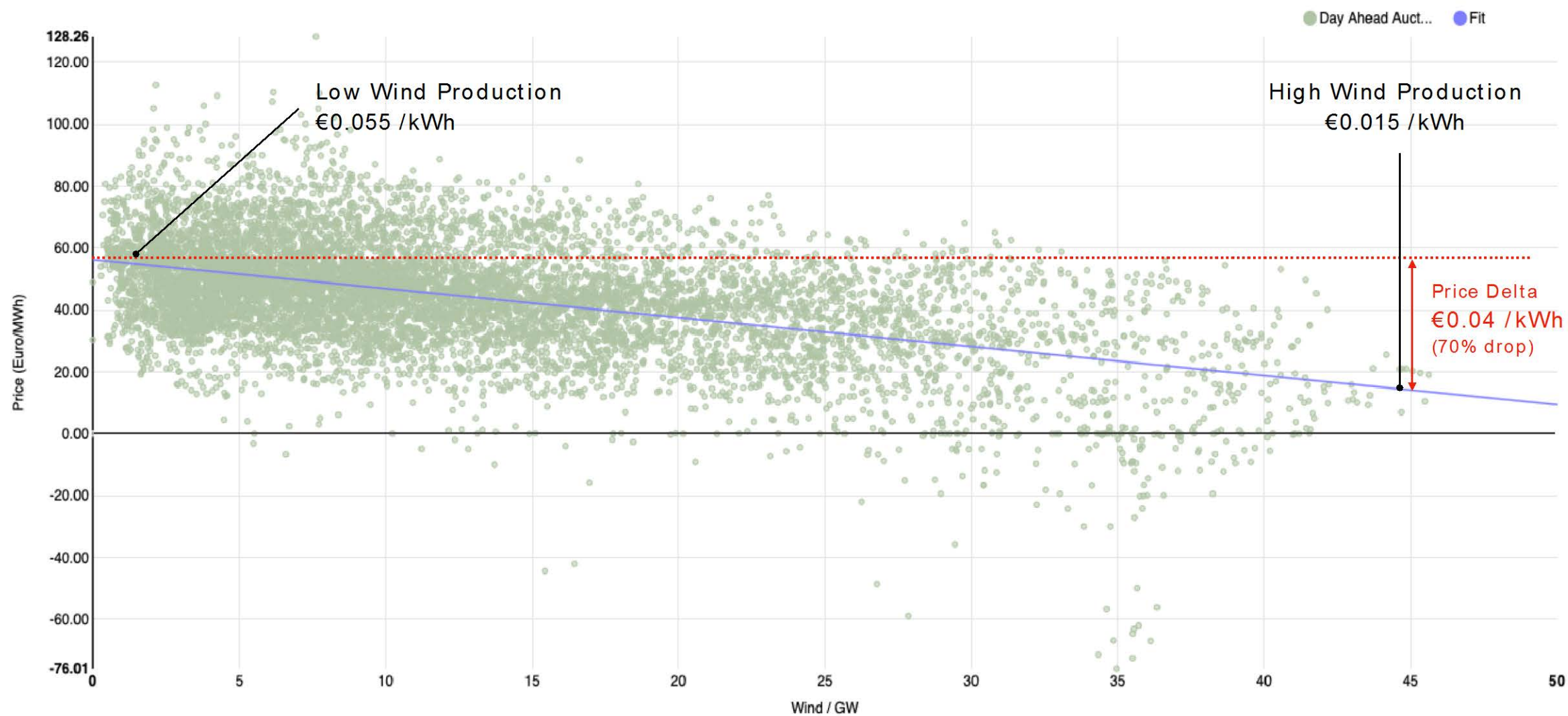
Daniel Buhagiar

Co-Founder | FLASC



(photo: Nicholas Doherty)

Wind Spot Prices for Germany 2018

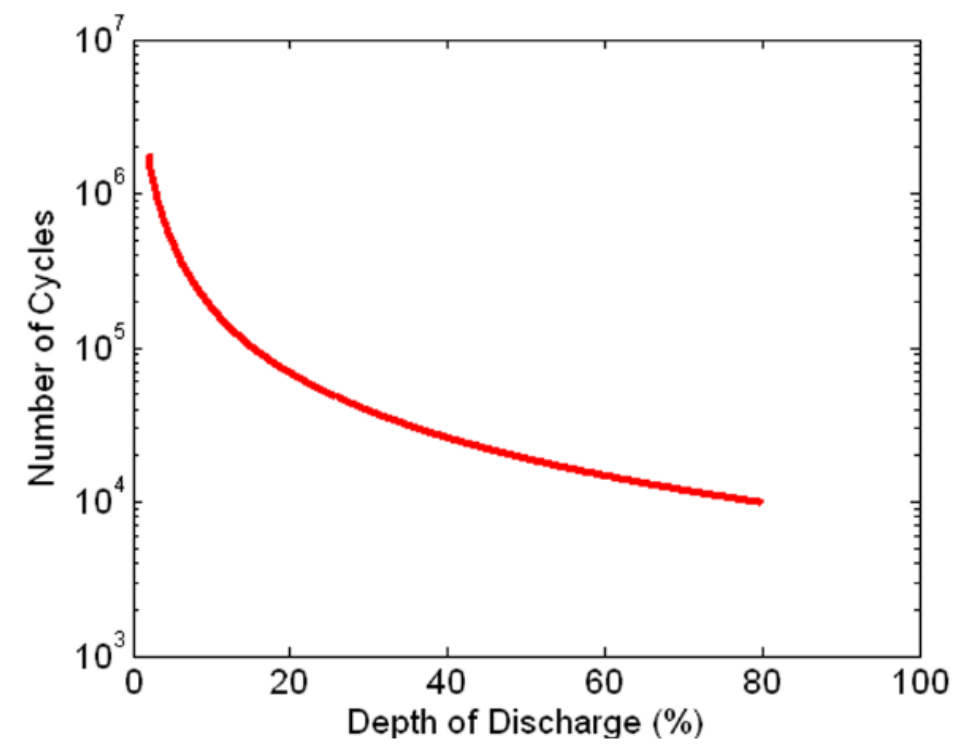




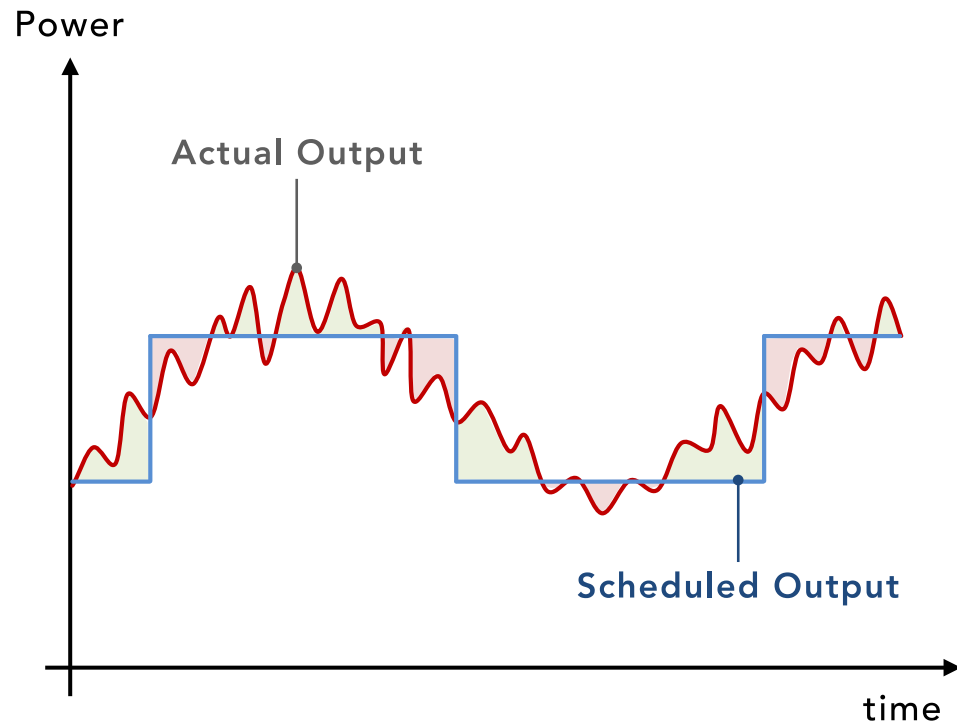
(photo: Tesla Inc.)



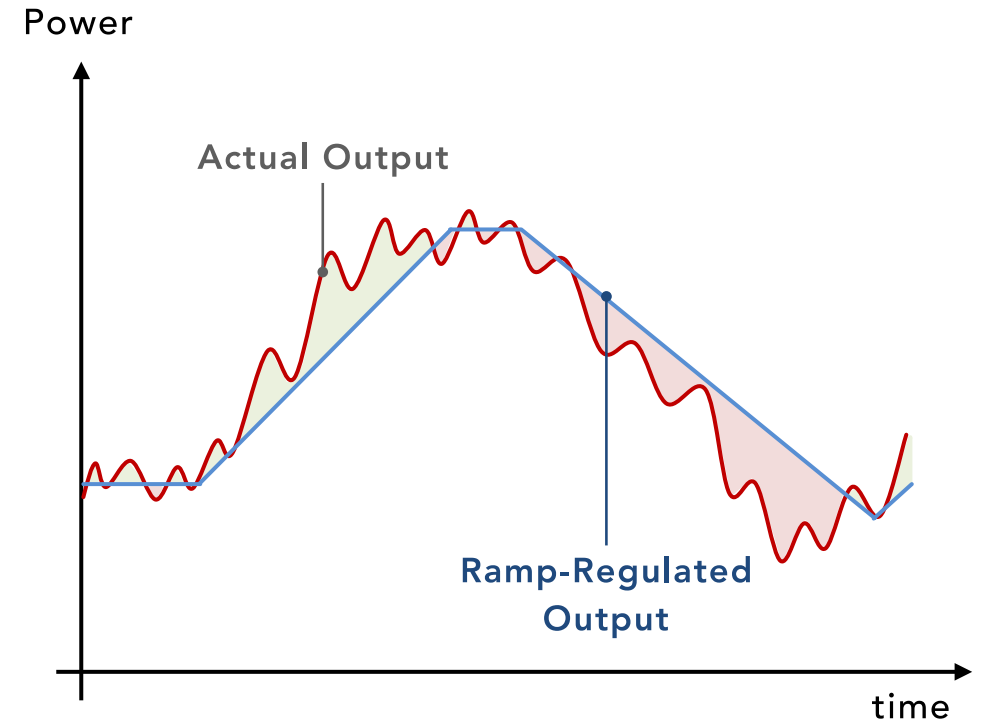
80%



Wind + Storage Operational Strategies



Stepped Output

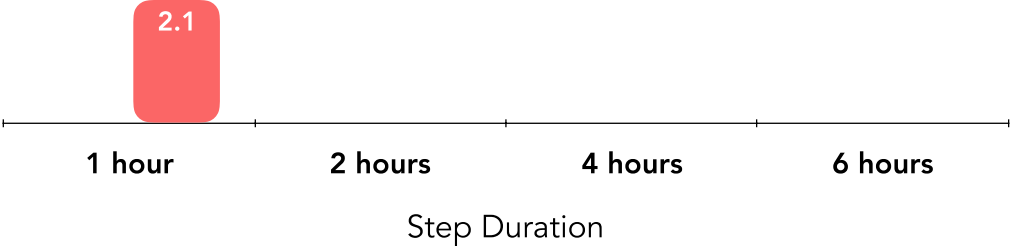


Ramp Regulation

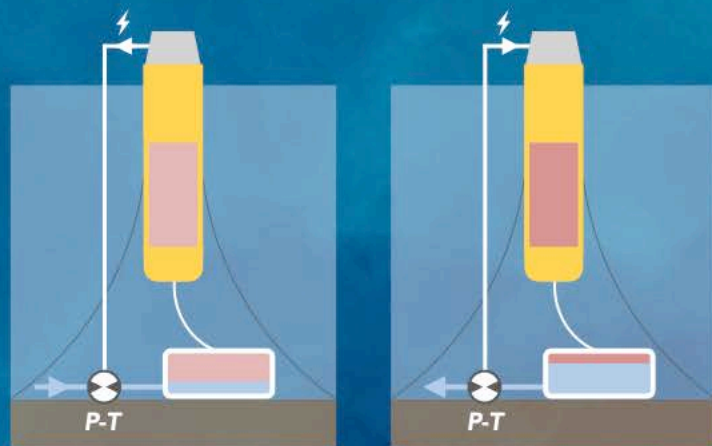
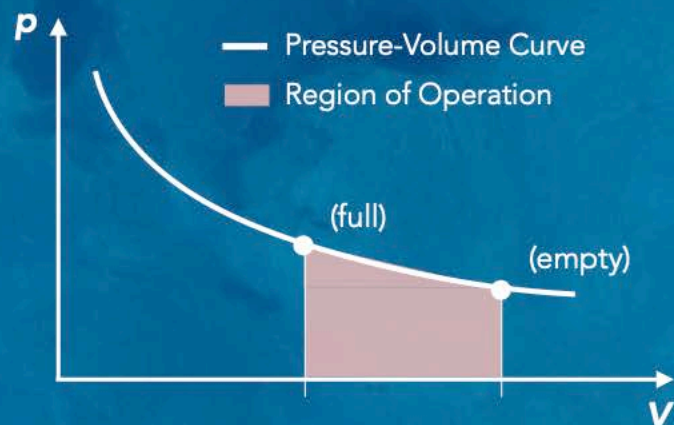
6MW Wind + Li-Ion Battery Capacity and Battery Lifetime

Ramp Regulation

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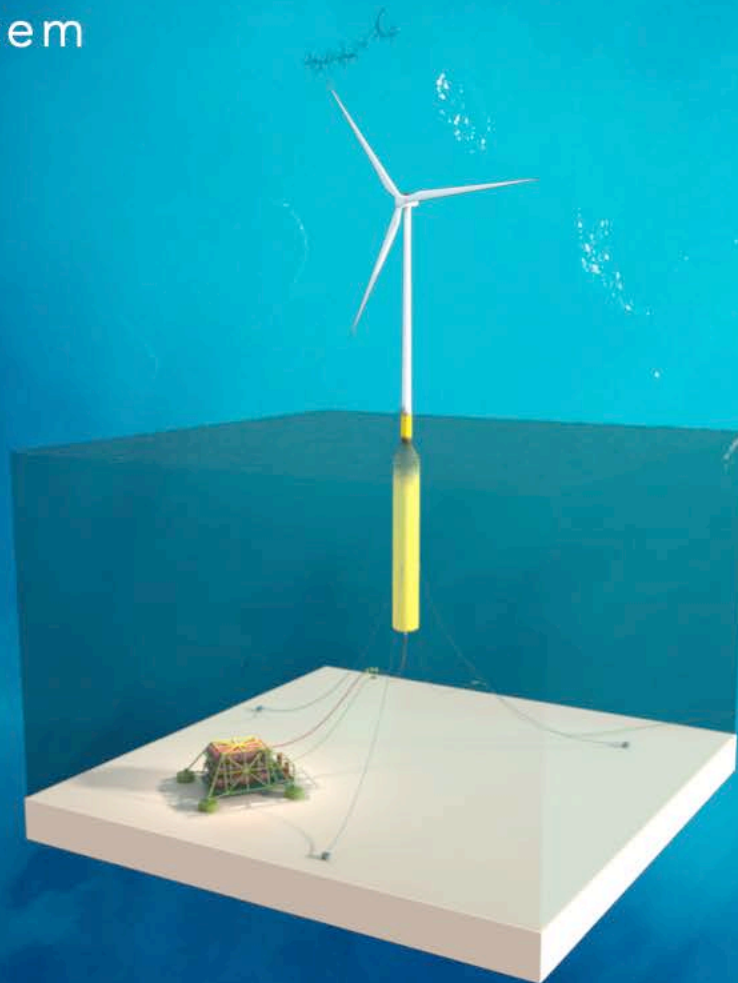
FLASC Energy Storage System



Charging Mode

Discharging Mode

6 MW Floating Wind Turbine
+ **8 MWh** Integrated Storage
(sample embodiment - image to scale)



Tailored for offshore

- ▶ No Hazardous Materials
- ▶ Established Supply Chains
- ▶ High Versatility
- ▶ Scalability: >10 MWh
- ▶ Thermal Efficiency: ~95%
- ▶ Design Lifetime: 25 years
- ▶ Capital Cost: <1,000 €/kWh



Key **Milestones**

- ▶ International Patents Granted
- ▶ +1 Year Operation at TRL 5
- ▶ >95% Measured Thermal Efficiency
- ▶ DNV-GL Statement of Feasibility

Next **Target**

- ▶ Large-Scale Demonstrator (2021)

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