



# SweGRIDS



**Energy Management System (EMS) models for the optimal real-time operation and control of Battery Energy Storage Systems (BESS) for peak shaving and frequency regulation**

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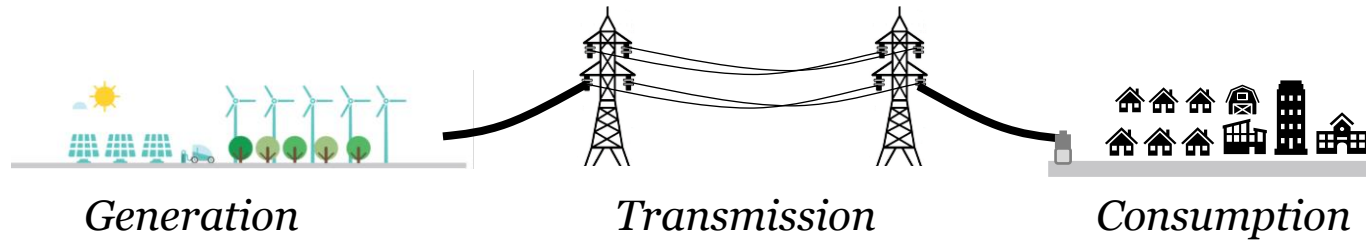
**Project funded by:**



# Motivation: Challenge & Opportunity

SweGRIDS

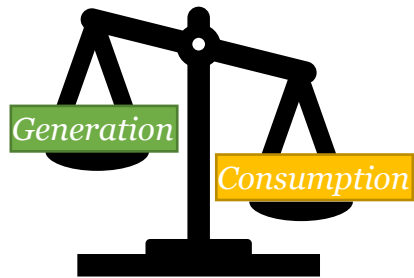
## Future we want



## Challenges we have

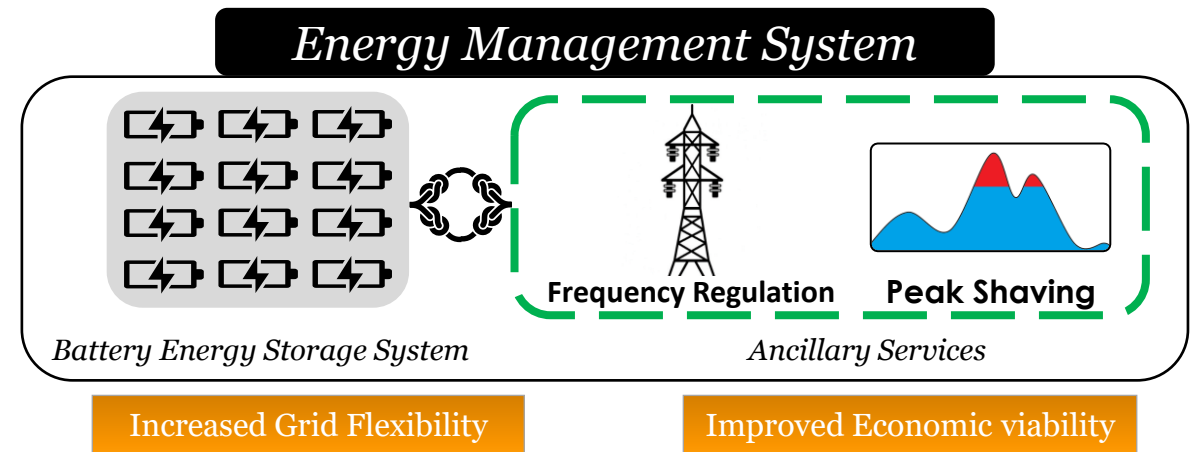


Non-dispatchable energy sources

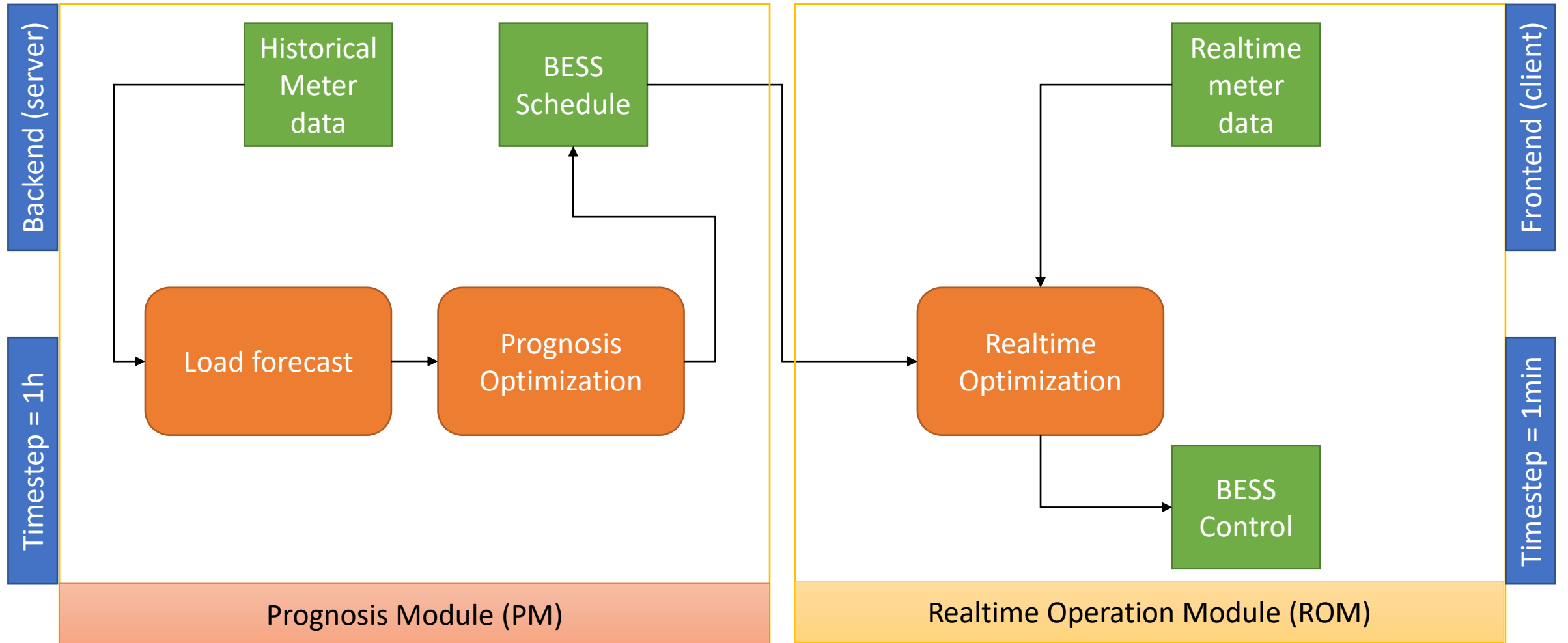


Electricity Demand-Supply Imbalance

## Solutions we propose



# Approach: EMS Architecture



# Validation: Case Studies

## Öckerö Ice rink<sup>[1]</sup>



Solar Peak Power (DC) : 180 kW



Proposed Usable BESS : 46 kWh / 46 kW

**12%** cost-saving in the monthly Grid Tariff

**21%** reduction in Peak power

**3 hours** of BESS capacity reserve for FCR-N for the test day

## Catena Jakobsberg<sup>[2]</sup>



Solar Peak Power (DC) : 220 kW



Proposed Usable BESS : 150 kWh / 100 kW

**24%** Return on Investment of the System

**13%** reduction in Peak power

**479 hours** of BESS capacity reserve for FCR-N annually

- [1] H. Shafique, L. B. Tjernberg, D. -E. Archer and S. Wingstedt, "Energy Management System (EMS) of Battery Energy Storage System (BESS) – Providing Ancillary Services," 2021 *IEEE Madrid PowerTech*, 2021.
- [2] H. Shafique, L. Bertling Tjernberg, D. -E. Archer and S. Wingstedt, "Behind the Meter Strategies: Energy management system with a Swedish case study," in *IEEE Electrification Magazine*, vol. 9, no. 3, 2021.





THANK YOU