



**KIEFFER**

# Transition to Trading 2.0

Digitalization and  
automation of market  
participation

**Continuous Evolution of Energy Market landscape - New Challenges to be addressed**

**Technology Advancements: GPU accelerated forecasting techniques and AI supported decision making**

**Hyperion -X one platform to combine them all**

**BESS Revenue Optimizer for maximum profitability**

**Use case: Self consumption - Net Billing**

# Energy Trading 2.0

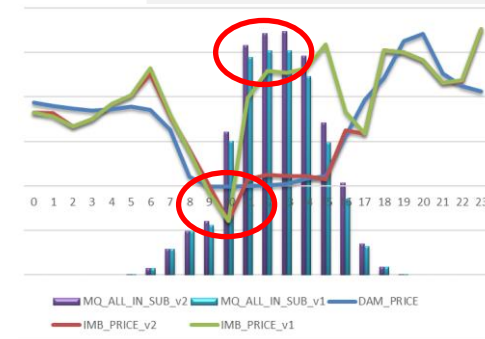
# Continuous Evolution of Energy Market landscape – New Challenges to be addressed (1/2)

## Energy Market related updates

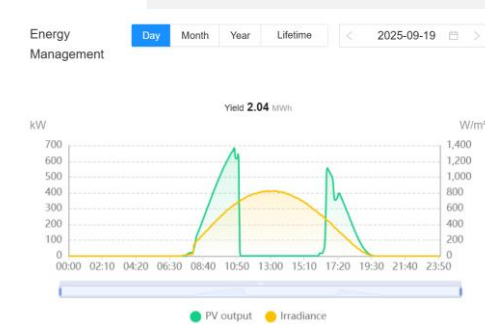
- Wholesale Markets** Introduction of 15-minute resolution in Wholesale Markets
- Introduction of negative prices in Balancing market** Negative Prices
- DAM Prices** Appearance of first negative DAM prices in May and increased frequency ever since
- Curtailement imposition to small RES parks** RES Curtailments
- BESS Systems** Introduction of first BESS systems affecting market participation
- Finalization of regulatory framework for dispatchable RES assets and BESS systems** Regulatory Framework



EnEx → 15mins



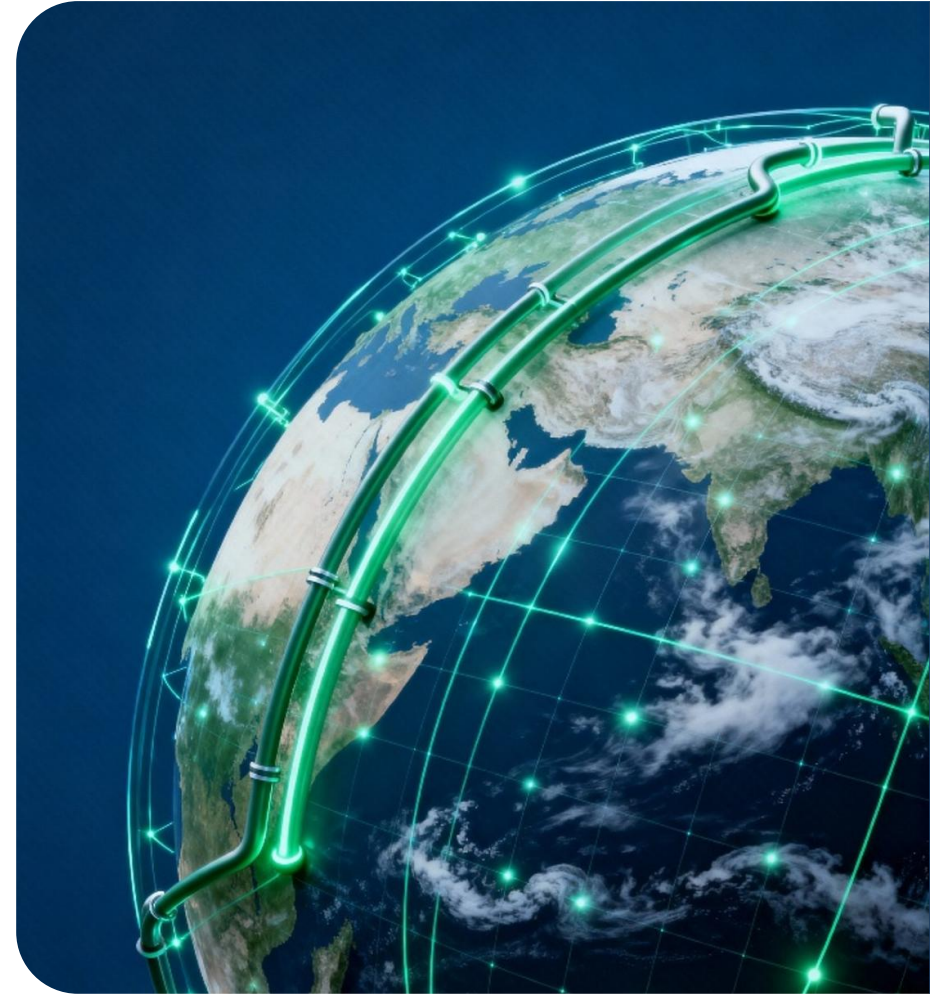
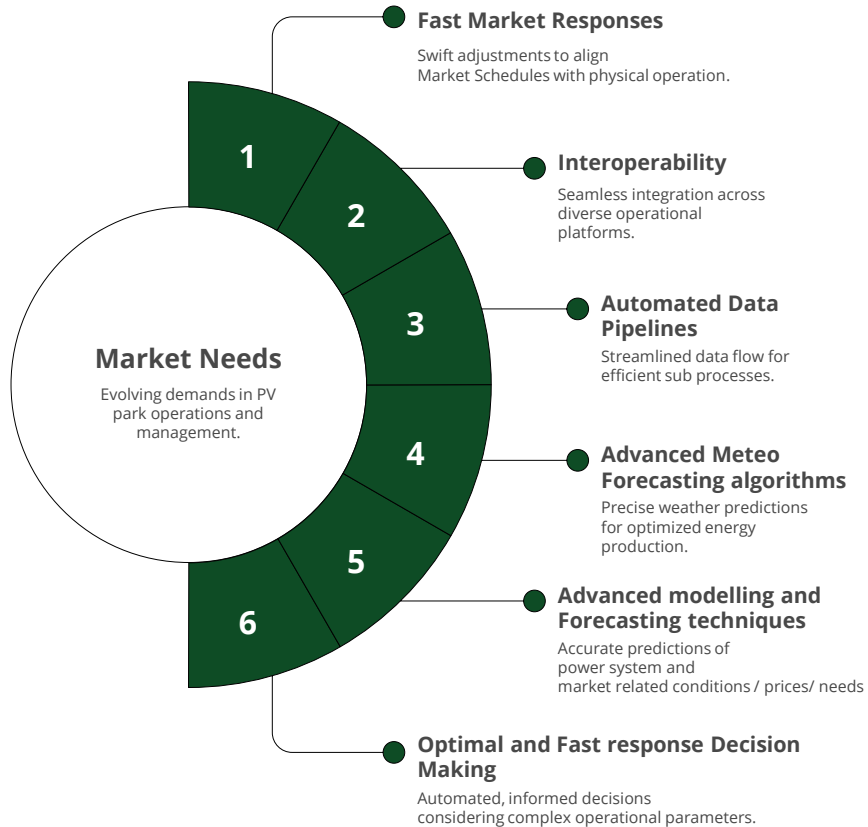
Negative DAM and Balancing prices



RES assets → increased curtailments

# Continuous Evolution of Energy Market landscape - New Challenges to be addressed (2/2)

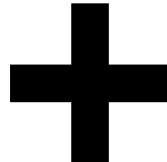
## Navigating Market Needs in PV Park Operations



# Technology Advancements: GPU accelerated forecasting techniques and AI supported decision making



## NVIDIA HGX B200



## Earth 2 Libraries for kilometer-scale forecasts

Earth-2 began by exploring the promise of ML weather prediction

TO BEGIN, WE CAN TETHER TO EXISTING CLIMATE PREDICTIONS

Using the world's current data library of 100-km resolution intergovernmental climate predictions.

Physical processes of forecast range & model resolution

Forecast ML EMULATION

DIGITAL TWINS

Forecast Energy Forecasting

Customer Weather Forecasting

Operational Optimization

**EARTH-2: LOOKING AHEAD**

We are pursuing various strategies to improve our climate digital twin.

- CMIP-6 Initialization or Rerun/step
- ICON User Involvement
- GOX Hardware/software co-design
- 1km @ 9.5 km Air-ub: global simulation
- Regional Flow: Training and Downscaling
- Model Auto-Calibration via RL

**Earth-2 Began by Exploring Data-Driven Weather Prediction**

**FourCastNet**

- Scope: Global, Medium Range
- Model Type: Full Model At Runtime
- Architecture: Attention (Stateful Recurrent Neural Net)
- Resolution: 25km
- Training Data: ERA5 Reanalysis
- Model Condition: 0-25 sec (2-week forecast)
- Inference Time: 0.25 sec (2-week forecast)
- Speedup vs NWP: 0.5x (10x)
- Power Savings: 0.1x (10x)

Harnessing the Next Generation of Computational Power

Unprecedented speed in data processing and AI model training

Ultra fast performance enabling real-time forecasting and optimization

Support for massive parallel simulations of weather, grid dynamics, and market conditions

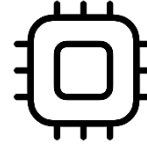
Combination of deep learning and high-resolution climate modeling to predict

Enables sub-hourly forecasts for renewable generation, grid balancing, and trading decisions



## Meteo data

- Data for any geolocation
- Daily and hourly forecasting procedures to support DAM, IDAs and XBID



## Advanced ML models

- Forecasting :
- RES generation
  - Energy Market prices and conditions



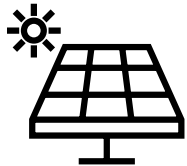
## Energy data

- Historical and real time data organization and management
- Real time Data corrections-adapt to curtailments
- Historical power Curtailment Data
- Real time announced curtailments updates (new IPTO-HEDNO methodology)
- Cross - check procedures with IPTO data

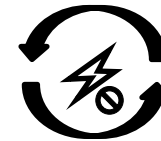


## Strategic Decision Making

- Optimal market positioning – re positioning
- Adapting to market changes
- Mitigating risks and increasing revenues



## RES Assets



## Adaptation to curtailments



**HYPERION-X**



Automated Market participation  
+ RES asset owner payments



# Hyperion -X: full automated energy management platform (3/3)



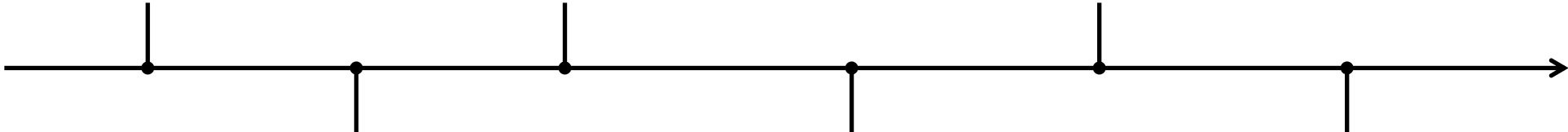
Historical and real time  
Data management



Accurate  
forecasts



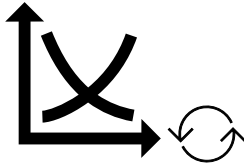
Automated strategic  
positioning and risk  
mitigation



Insightful  
graphs and  
metrics



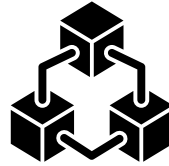
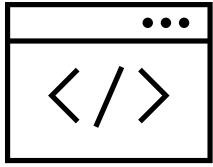
Automated market participation, stress  
identification (e.g. curtailments) and  
repositioning



Automated Settlement  
billing and payment  
process



# BESS Revenue Optimizer for maximum profitability

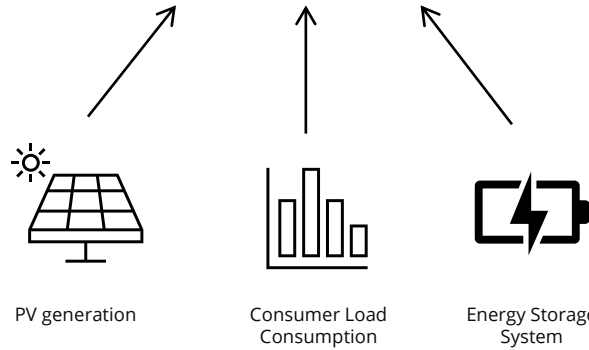
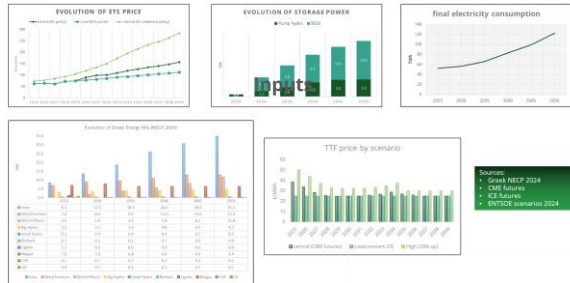


Optimization problem

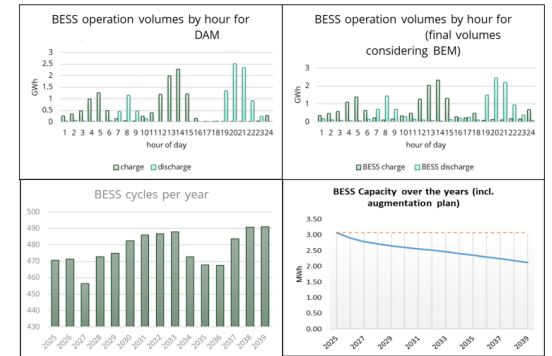


- Optimal BESS operation schedule (charge-discharge)
- Market Positioning
- Capacity Degradation
- Optimal cycling
- Energy Cost and profit Calculation
- Cost Benefit Analysis

## Feeds on fundamental market Inputs



Accounts for all technical (asset related) and market related constraints to solve a profit maximization problem



## Step 1: Short term forecasts

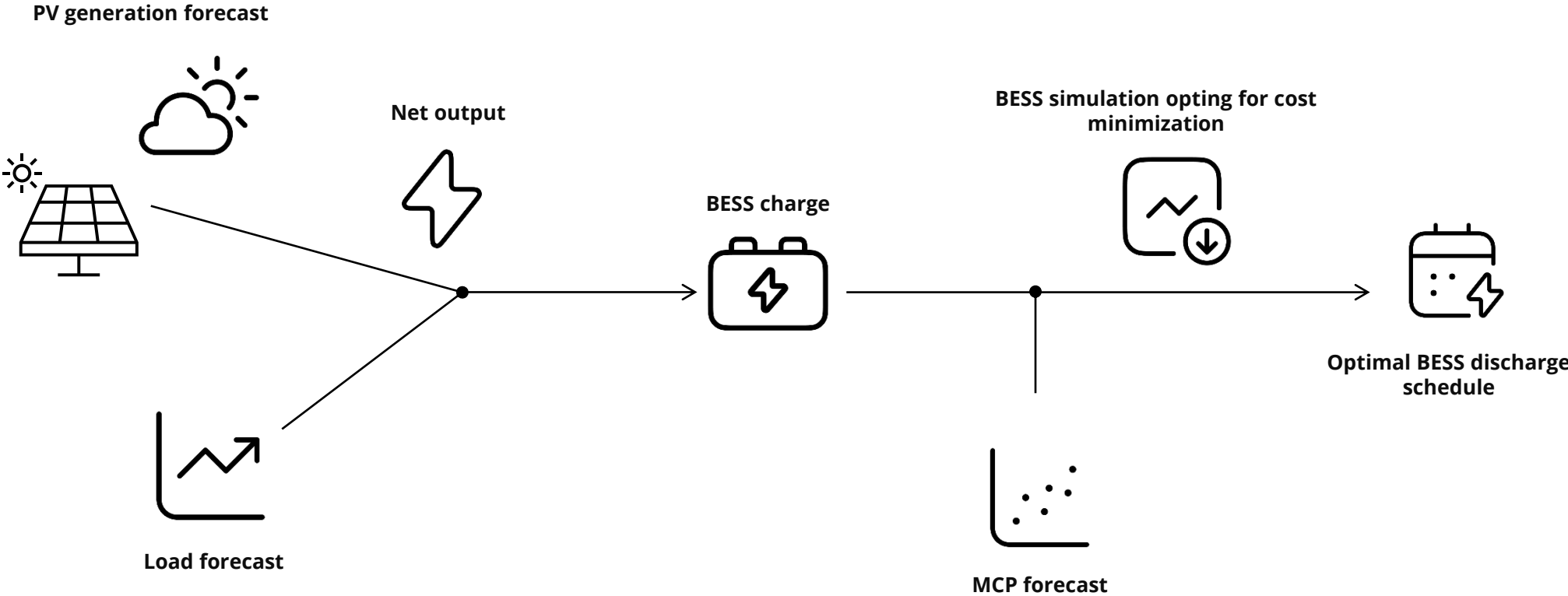
Volumes and prices

## Step 2: Optimization model run

Optimal Market Schedule - Repositioning

## Step 3: Output results

# Use case: Self consumption - Net Billing



# Thank You

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