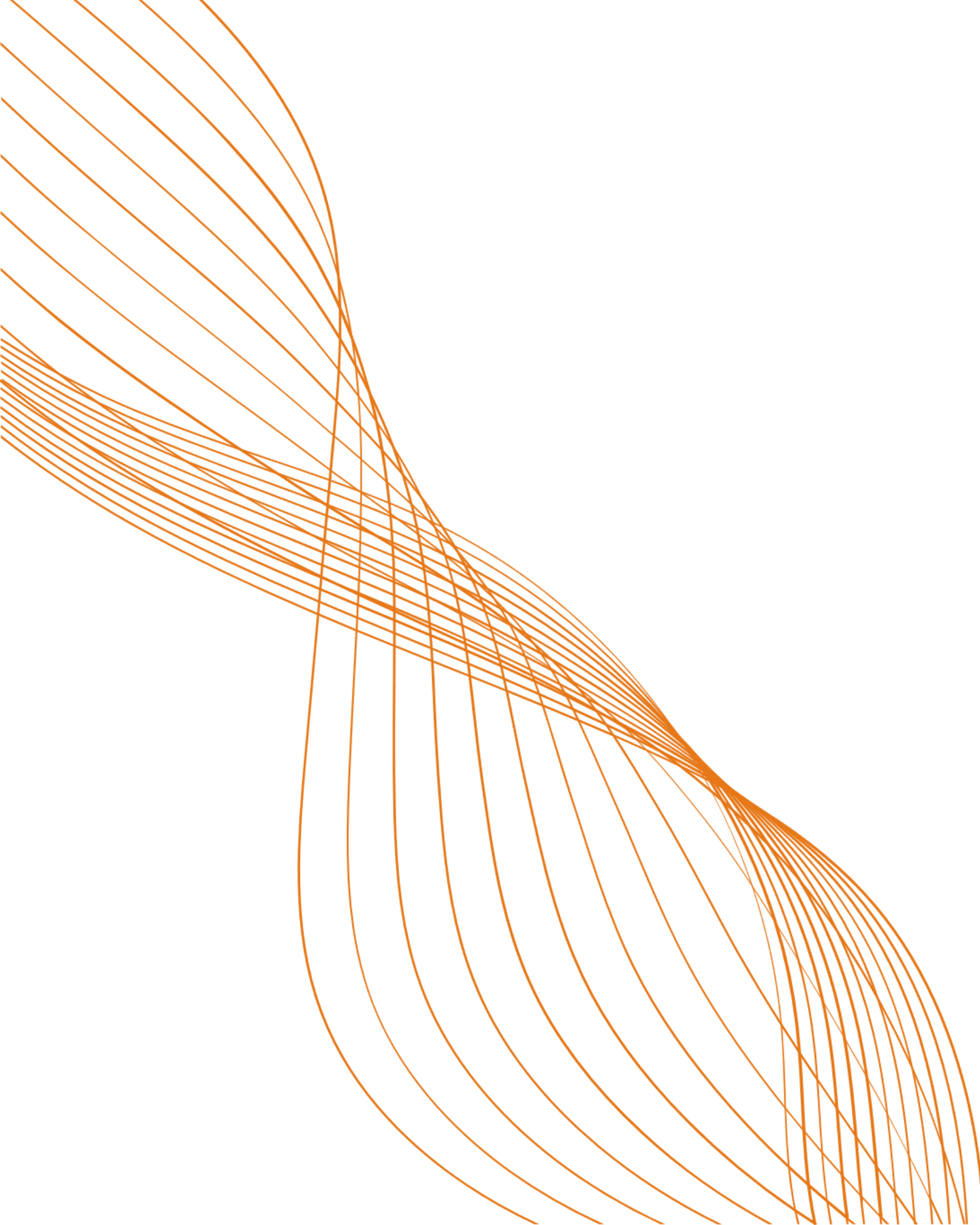




# AVEVA WORLD

ACCELERATE INDUSTRIAL INTELLIGENCE



# From Reactive to Predictive

Scaling Renewable  
O&M with Digital Twins

AVEVA

 **apollo**  
Energy Analytics



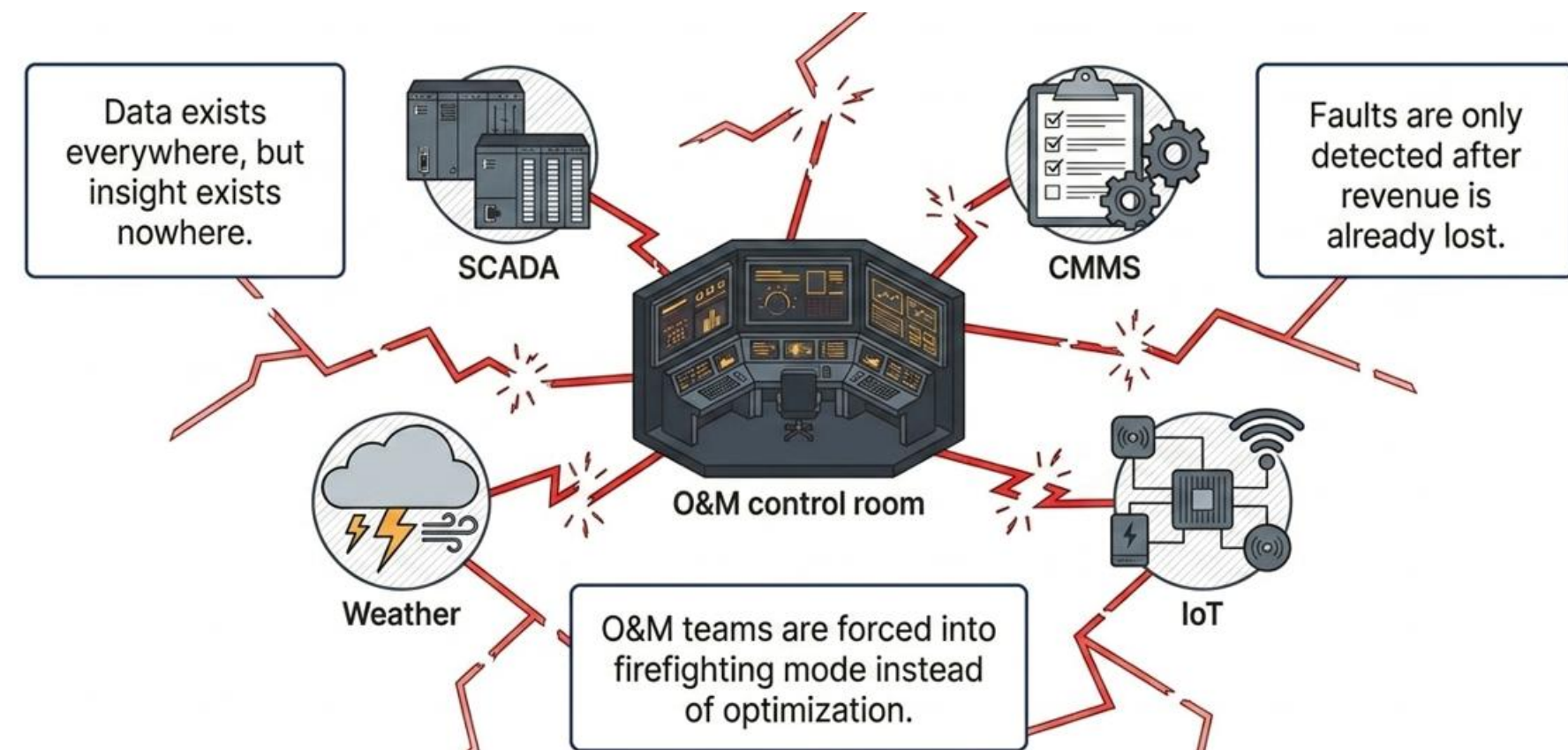
# From Asset Management to Asset Intelligence

Renewable portfolios are **scaling faster** than operational visibility

**Performance losses** remain invisible at the executive level

The next 10–15% value will come from **intelligent operations** and not new capacity

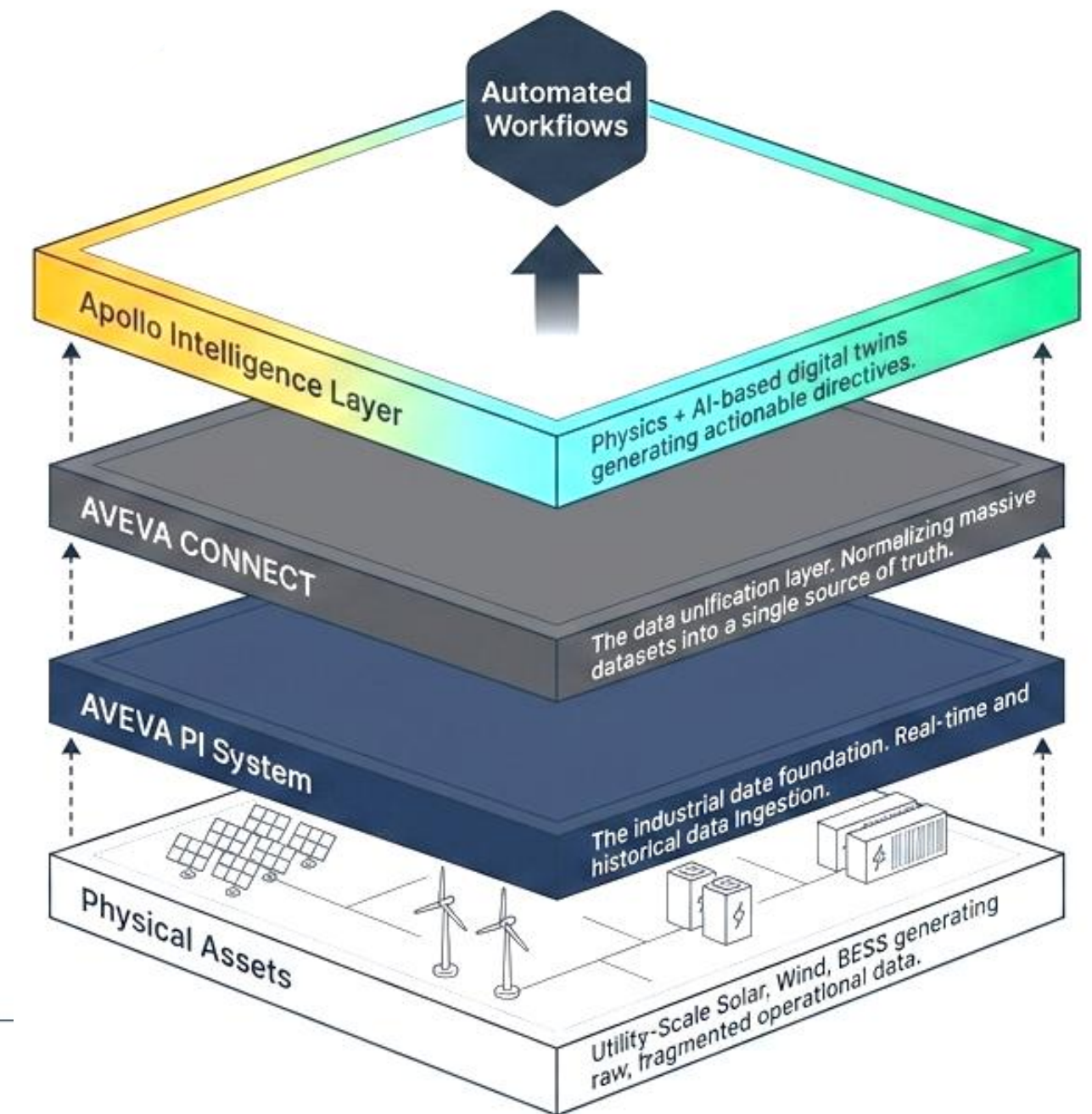
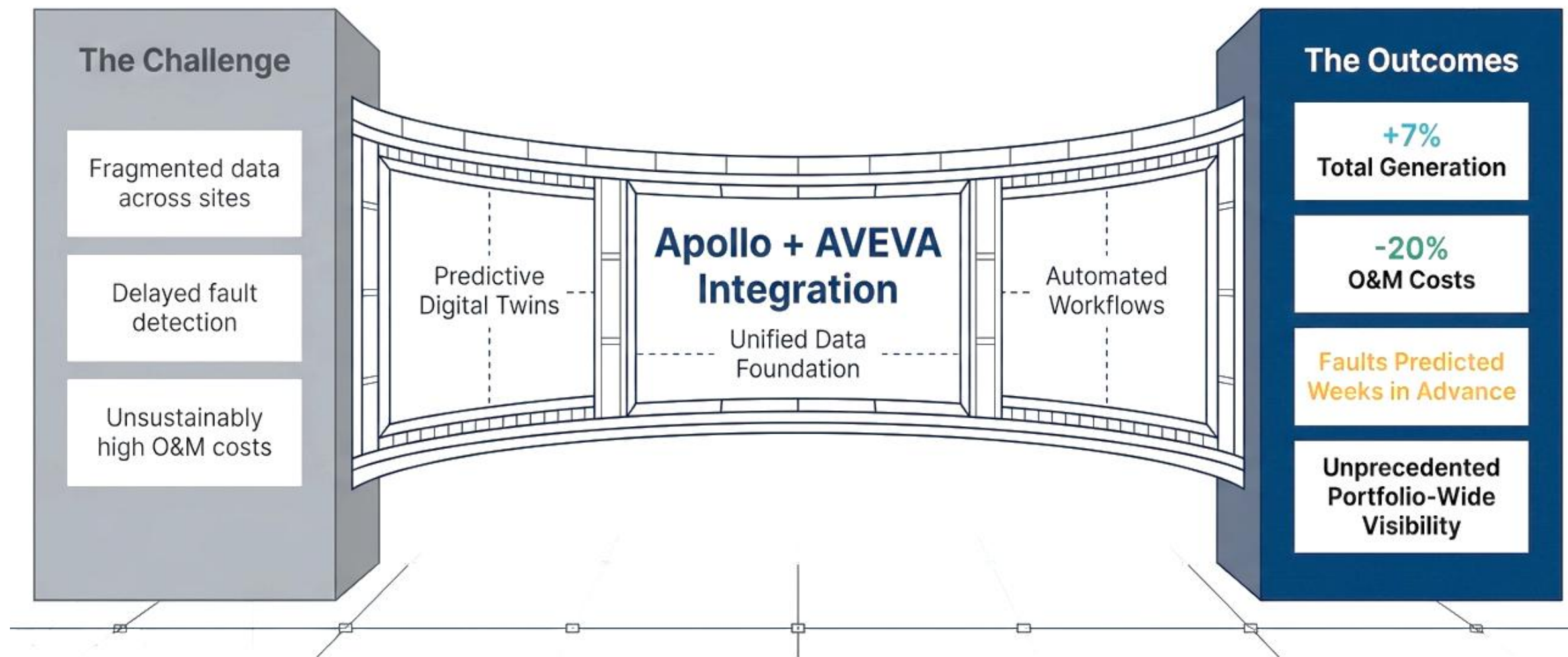
Why the next phase of renewable value creation is intelligence-led



# Apollo + AVEVA

## Unified Data Foundation

The challenges, the data  
and the outcomes





# Apollo Platform Offerings



## Services

- Custom Template Reports
- Plant Performance Enhancements
- Video Wall NOC Setup



## Central Monitoring

- ROC & Command Centre
- Events & Alarms
- Kiosk TV Dashboard



## Maintenance Management

- CMMS
- Inventory
- Check Lists
- PTW, HSE & HR
- Mobile App
- Documents



## Predictive Analytics

- Digital Twin, Loss Bucketing, Failure Prediction and Performance Recommendation
- Custom Analysis & Reporting
- All Admin Apps



## Generation Forecast

- Weather Forecast and Power Forecast
- Inter day & Intra Day & 7 Days Ahead
- Satellite Weather Integration

# Technology Enablers

- Today, Apollo supports **20+ GW of solar, wind, and battery assets** across multiple geographies and OEMs.
- We combine our **patented digital twins, advanced analytics, and plant-level diagnostics** to surface hidden performance losses.
- The platform enables leadership teams to move from monitoring assets to actively protecting returns.



## Patented Digital Twin

Apollo's patented digital twin is a **physics and data-driven virtual replica of renewable assets** that models how each asset is expected to perform under real-world conditions.



## Hybrid Asset Intelligence

Applies a unified analytics framework across **solar, wind, and BESS portfolios** in a single platform. Enables plant-level risk ranking and intervention prioritization across technologies.



## AI Models

Learns **normal vs abnormal behavior patterns** across inverters, strings, turbines, and BESS components to **predict failures** weeks in advance.

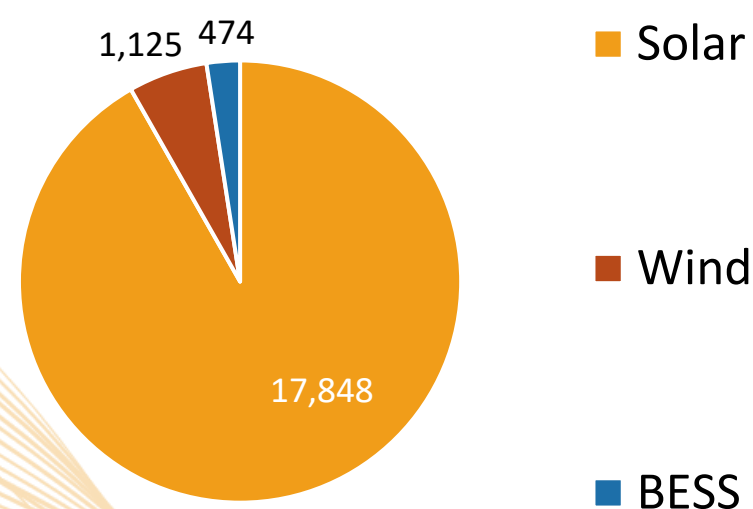


# 20+ GW of Portfolio Delivered across Solar, Wind and BESS Portfolios

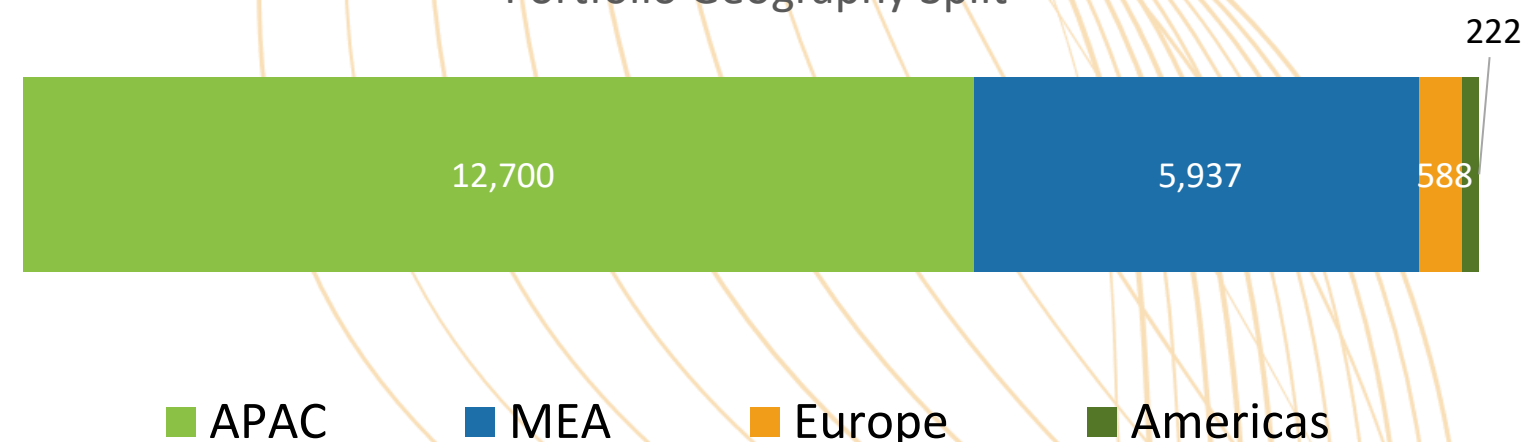
## Market Position

- 20+ GW portfolio under management
- Presence across 25+ countries
- Market leader in India and MEA\*
- Strong base in:
  - APAC (~12.7 GW)
  - MEA (~5.9 GW)
  - Americas 220MW

Deployed Capacity



Portfolio Geography Split



\*2026 Pipeline Projects Solar: 10 GW, Wind: 4 GW and BESS: 2 GWh

# Case Study 1

## Generational Gains Improved by 3.4%



### 800+ MW Solar Plant, Middle East

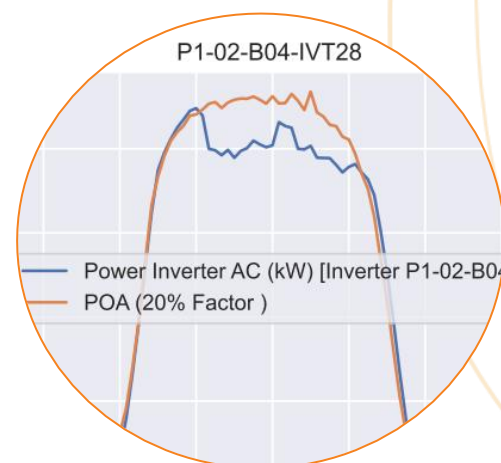
**2,400,000** PV Modules  
**3200** Inverters  
**108** Transformers  
**2600** Single Axis Trackers  
**2400** Acres of Desert Land

**Variety** – 1000s Tag types  
**Velocity** – Collected every 1 minute  
**Volume** – 1 Bn + Tags / Day

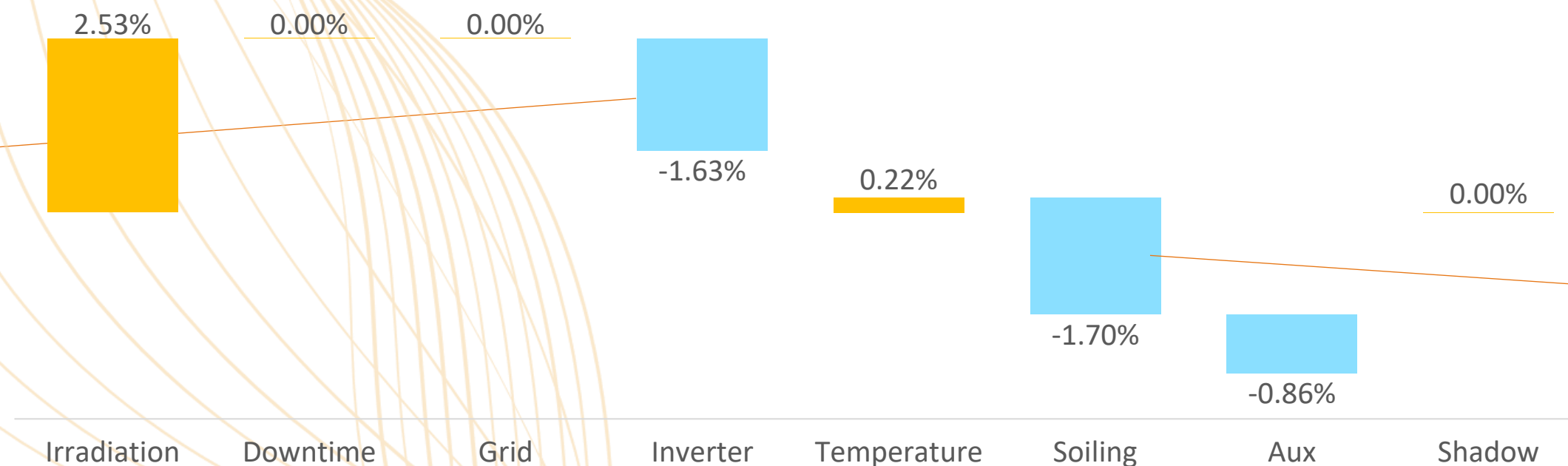
### Apollo Impact in ~ 45 Days

1. Generation gain by **3.4 %**
2. Productivity increase by **50%**
3. Annual Loss Saved were **USD 3.2 Mn**

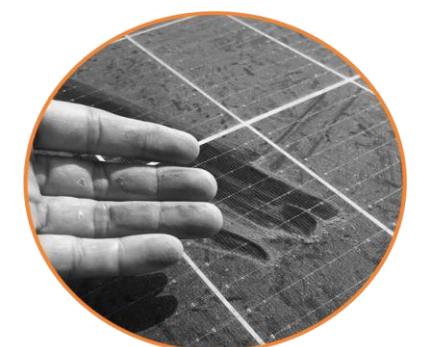
### Plant System Loss Analysis



Generation Gain:  
**USD 2,500 / Day**



Generation Gain:  
**USD 2,188 / Day**





# Case Study 2

## Asset Failure Prediction 7 Days in Advance



### 10 MW Solar PV Plant, Europe

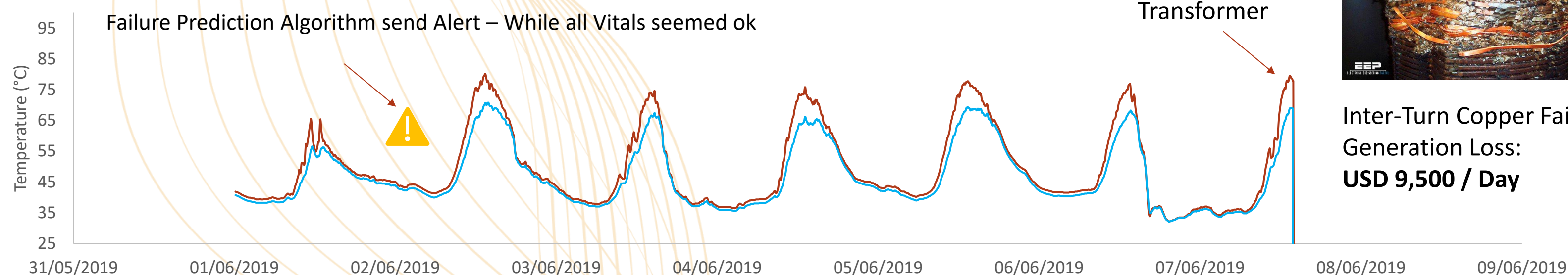
30,000 PV Modules  
20 Inverters  
5 Transformers  
50 Acres of Area

Variety – 100s Tag types  
Data Sampling Interval – Collected every 15 minute  
Data Volume – 10k + Tags / Day

### Apollo Impact in ~ 180 Days

1. Transformer Failure prediction **6 Days in advance**
2. Loss Saved – **USD 0.37 Mn**

### Transformer Failure Prediction





# Case Study 3

## Actionable Insights via Loss Buckets



### 50 MW Solar PV Plant, Asia

**150,000** PV Modules  
**50** Inverters  
**14** Transformers  
**230** Acres of Desert Land

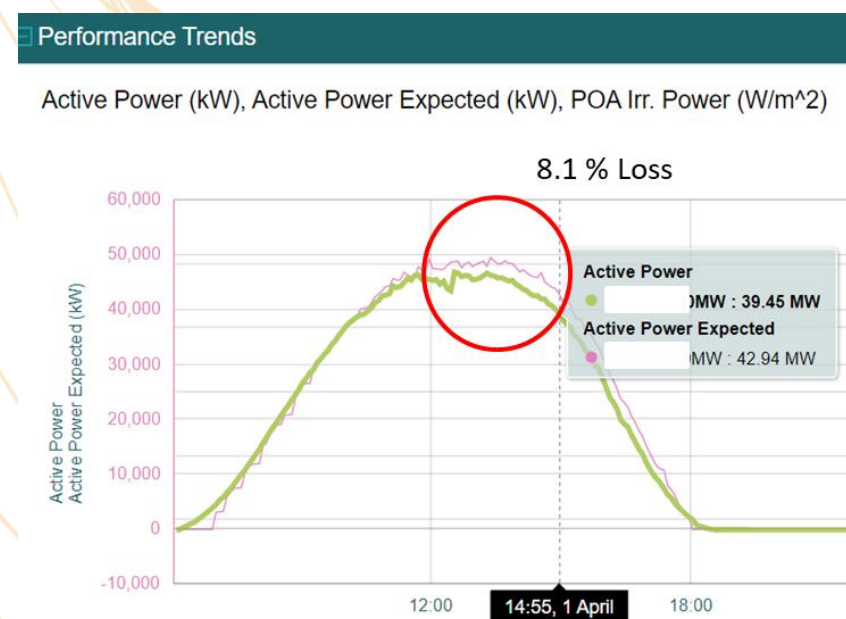
**Variety** – 1000s Tag types  
**Velocity** – Collected every 15 minute  
**Volume** – 100,000 + Tags / Day

### Apollo Impact in ~ 12 Months

1. Generation gain by **6.5 %**
2. Annual Loss Saved – **USD 0.24 Mn**

### Digital Twin identifies 8.1% Loss

*The Digital Twin is an electrical replica of the Solar or Wind power plant and uses both historic and current behavior using sensors, and data combined with modeling and simulation.*



**8% Loss** identified by Digital Twin



Reasons for the loss of 8% identified through **Loss Buckets**



**745,524** PV Modules  
**76** Inverters  
**38** Transformers

1. Energy Loss: **808.59 MWh**
2. Revenue Loss: **~USD 25,000 in one day**
3. Eliminated misdiagnosis of asset underperformance

- Identified curtailment as external, non-asset-related loss
- Segregated loss into curtailment bucket
- Enabled operators to escalate to DISCOM/grid operator with evidence

Summary

Asset Performance

Energy Loss

Digital Twin Prediction

Failure Prediction

Soiling Optimisation

Financial Performance

Data Quality (Coming Soon)

Energy Loss Summary

08-02-2026 to 08-02-2026

Total Energy Export

1.14 GWh

Budgeted Energy Export

2.08 GWh

Predicted Energy Export

1.55 GWh

Non-Recoverable Energy

0.94 GWh

Recoverable Energy

0.00 GWh

Revenue Recoverable

0 ₹

| KPI                          | Designed | Actual | Delta % | KPI                                                    | Designed | Actual | Delta % |
|------------------------------|----------|--------|---------|--------------------------------------------------------|----------|--------|---------|
| Performance Ratio (%)        | 80.7     | 53.72  | ↓ 26.98 | Plant Availability <small>Energy Based (%)</small>     | 99.4     | 99.91  | ↑ 0.51  |
| Temperature Corrected PR (%) | 80.7     | 52.2   | ↓ 28.5  | Grid Availability <small>Energy Based (%)</small>      | 99.4     | 100    | ↑ 0.6   |
| DC CUF (%)                   | 19.9     | 10.94  | ↓ 8.96  | Transformer Availability <small>Time Based (%)</small> | 100      | 15.79  | ↓ 84.21 |
| Reactive Energy (MWh)        | 103.86   | -      | -       | Inverter Availability <small>Time Based (%)</small>    | 100      | 93.06  | ↓ 6.94  |
| Energy Export (GWh)          | 2.08     | 1.14   | ↓ 45.19 | CB Availability <small>Time Based (%)</small>          | 100      | 82.36  | ↓ 17.64 |
| Irradiation (kWh/m²)         | 5.02     | 4.89   | ↓ 2.59  |                                                        |          |        |         |
| Module Temperature (°C)      | 44       | 35.67  | ↑ 18.93 |                                                        |          |        |         |
| Ambient Temperature (°C)     | 19.1     | 18.15  | ↑ 4.97  |                                                        |          |        |         |

# Thank You

We help you Operate, Optimize and Outperform.

[Our Website](#)

[Our LinkedIn](#)

