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AI or not AI for fault prediction and climate risk assessment in solar plants: misconceptions and facts

1 June 2023

3:00 pm – 4:00 pm | BST, London
4:00 pm – 5:00 pm | CEST, Berlin
5:00 pm – 6:00 pm | EET, Athens

Anne Fischer
Senior editor
pv magazine

Govinda Upadhyay
CEO and Founder
SmartHelio

David Ebner
Project Engineer
Verbund Green Power

Luc Hossenlopp
CTO Digitization Energy BU
Schneider Electric

Welcome!

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Do you have any questions? ?

Send them in via the Q&A tab. We aim to answer as many as we can today!

You can also let us know of any tech problems there.

We are recording this webinar today.

We‘ll let you know by email where to find it and the slide deck, so you can re-watch it at your convenience.

The fastest path to **Net Zero**

Luc Hossenlopp
Strategy & Innovation VP

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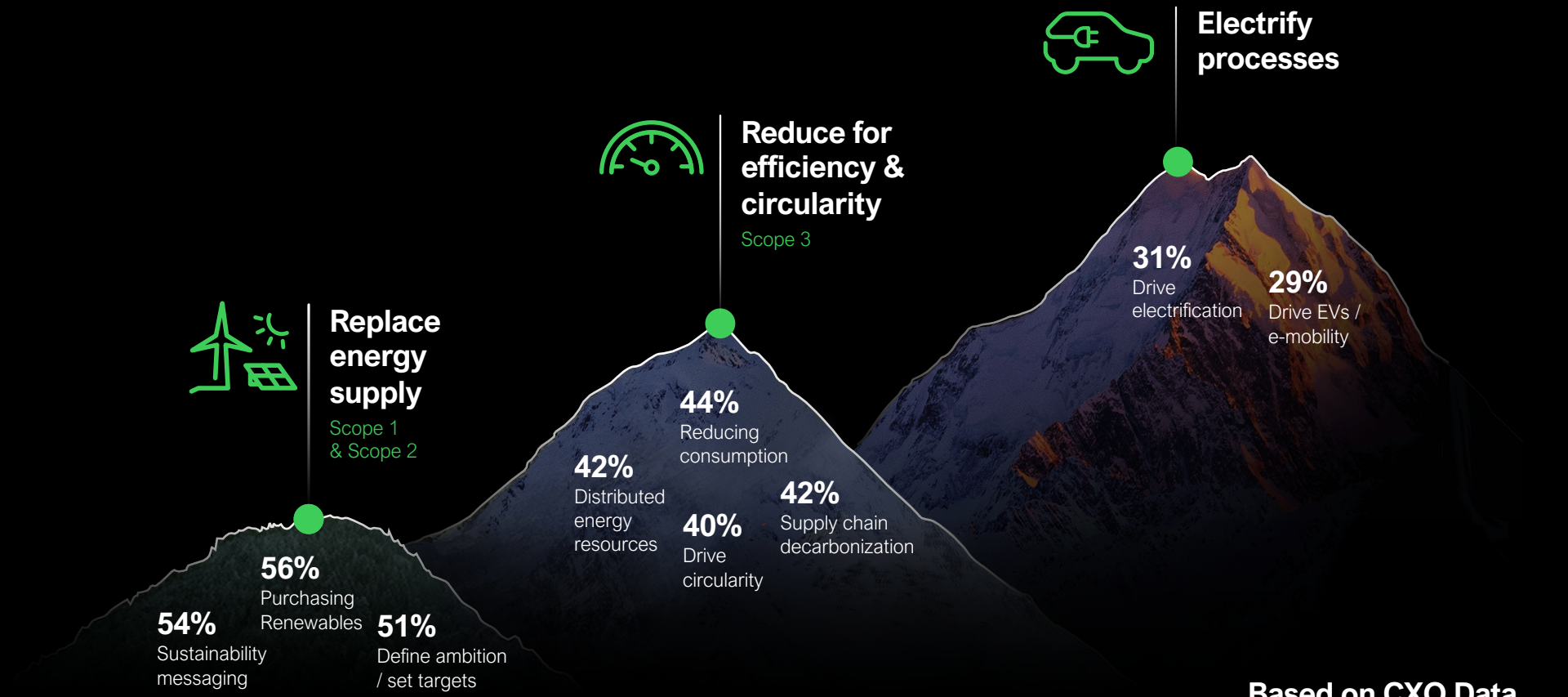
Digital + Electric = **Sustainable**

For Efficiency | For Decarbonization | Green and Smart Energy

What decarbonization activities are pursued most **today**?

Schneider Electric



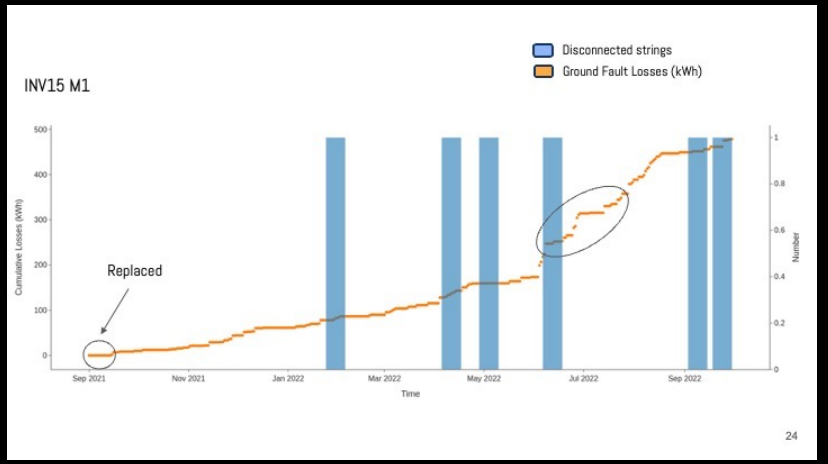
Based on CXO Data

PV generalization of what we do for other assets

Switchgear, transformer, UPS, Cooling systems, Motors, Pumps, etc.

1. USE AI, TOGETHER WITH ASSET PHYSIC DEEP EXPERTISE, to enable predictive maintenance, lifetime extension and operation efficiency

2. COMPLEMENT SOFTWARE WITH PEOPLE WHEN APPROPRIATE, such as project contextualization or maintenance policy change



3. CREATE TRUST AND TRANSPARENCY AT ALL LEVELS from C-suite to on-ground staff, have a single source of truth

4. MOVE TOWARD A BROADER SYSTEM APPROACH, for instance PV feeding microgrid analytics

Value perceived in the SmartHelio solution

Based on a pilot project result and extrapolation

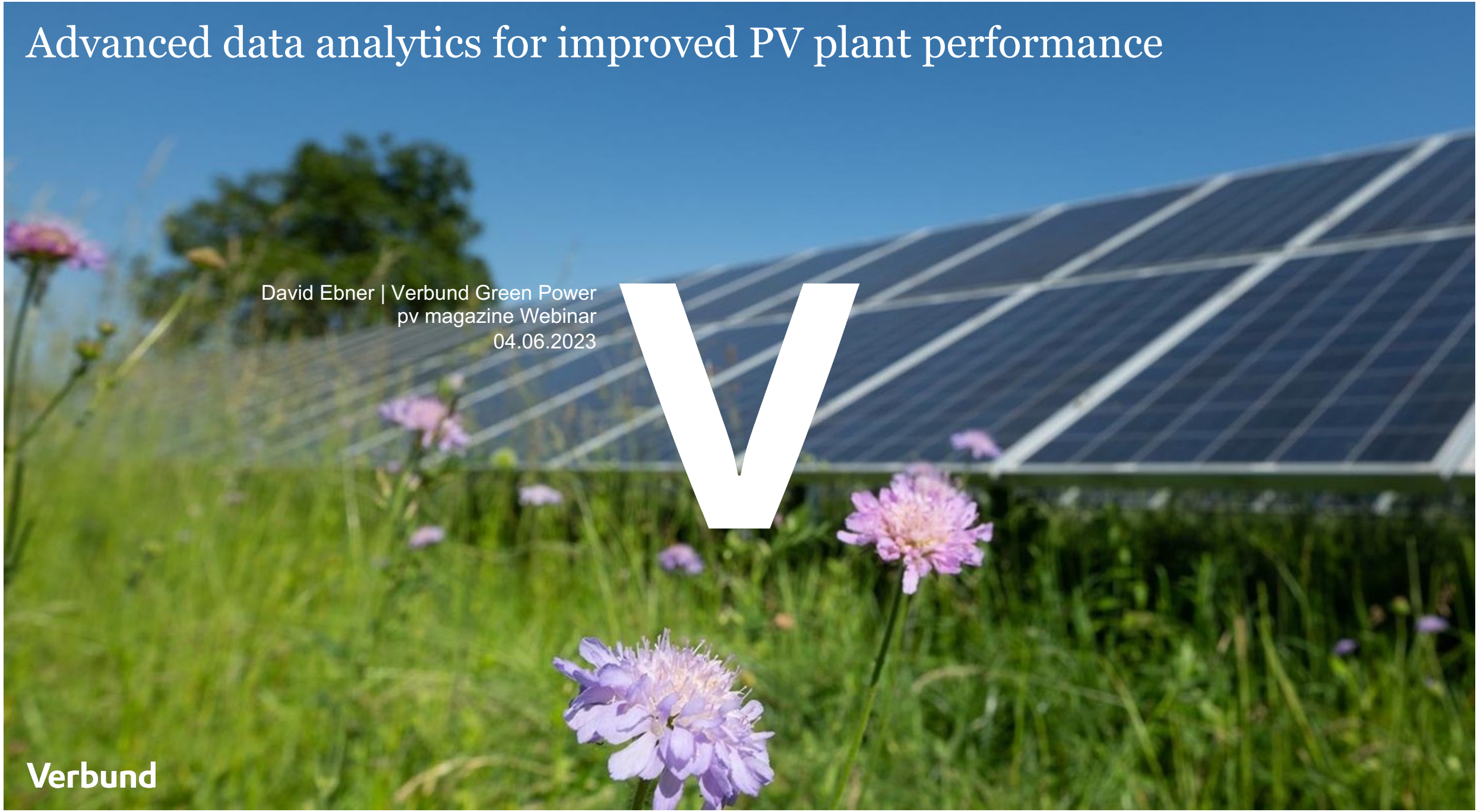
1. INCREASE PV USEABLE GENERATION - WHILE MINIMIZING MAINTENANCE & EXTENDING LIFE
   equivalent to an energy efficient action

2. SAFETY IMPROVEMENT - OVERVOLTAGE and FIRE

3. OPTIMIZE OVER TIME – PERFORMANCE ASSESSMENT & UPGRADE

Internal

Advanced data analytics for improved PV plant performance



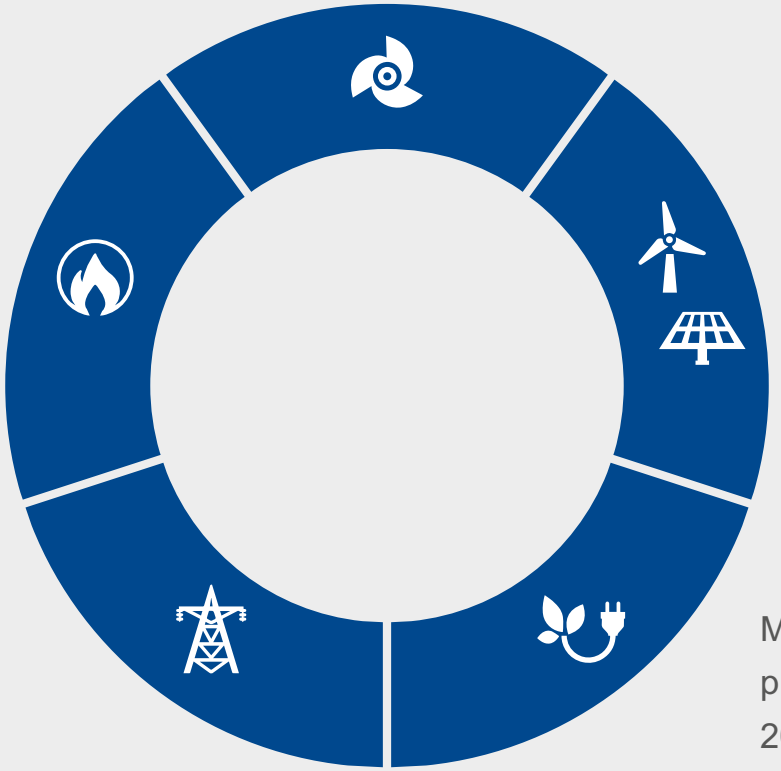
David Ebner | Verbund Green Power
pv magazine Webinar
04.06.2023

Verbund

VERBUND at a glance

129 VERBUND hydropower plants with over 8,300 MW capacity.

The GCA high-pressure natural gas grid is around **900** kilometres long.

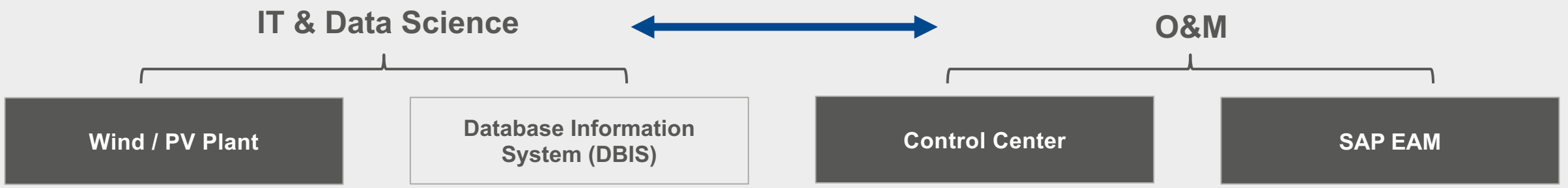


Up to **1/4** of total generation to come from solar and wind by 2030.

APG's (Austrian Power Grid AG) national electricity grid has around **3,400** kilometres of transmission lines.

More than **500,000** private customers trusted VERBUND in 2021.

Data flow @ VERBUND



Data Collection

Standardized data acquisition

Additional on-site sensors

Pre-defined interface towards trading and grid operators

Connection to DBIS

Data Processing

Data validation and normalization

KPI calculations

Advanced Data Analytics

Statistical modelling

Physical modelling

Interface Alarming, Monitoring & Reporting

Data Visualisation

Real time visualisation of the complete Wind/PV fleet

Historical data investigations

Customised Dashboarding

Optimization of maintenance scheduling

Triggering of work orders and interface to SAP EAM

Workforce Mgmt.

Recurring inspections, maintenance and repair scheduler

Digital log book administration

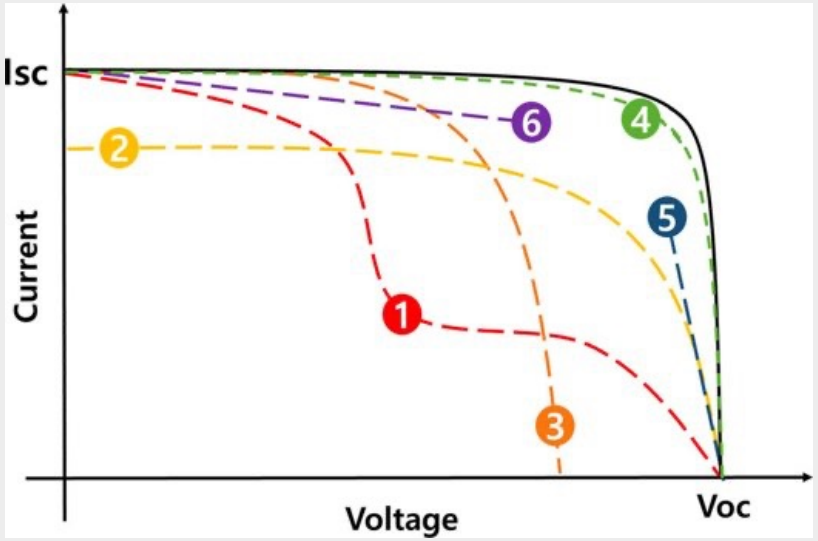
Work order administration

Spare part management

Assignment of Resources

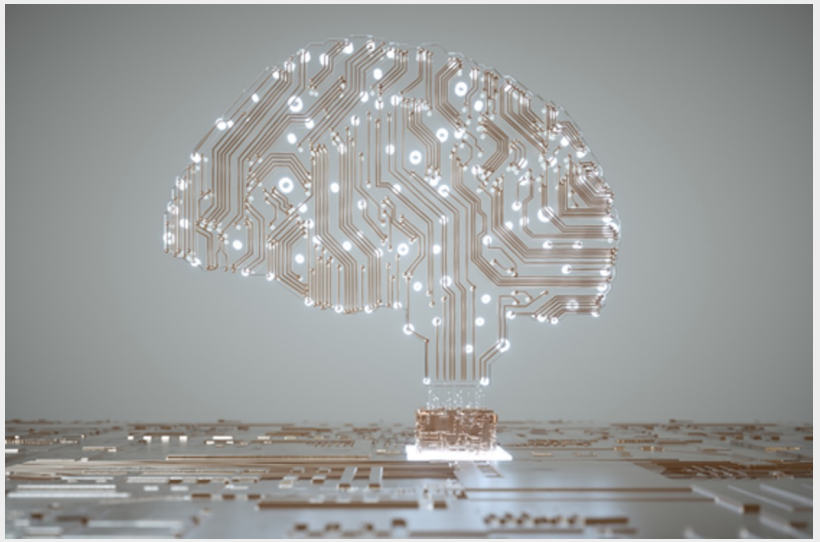
Advanced data analytics models

Physics based modelling



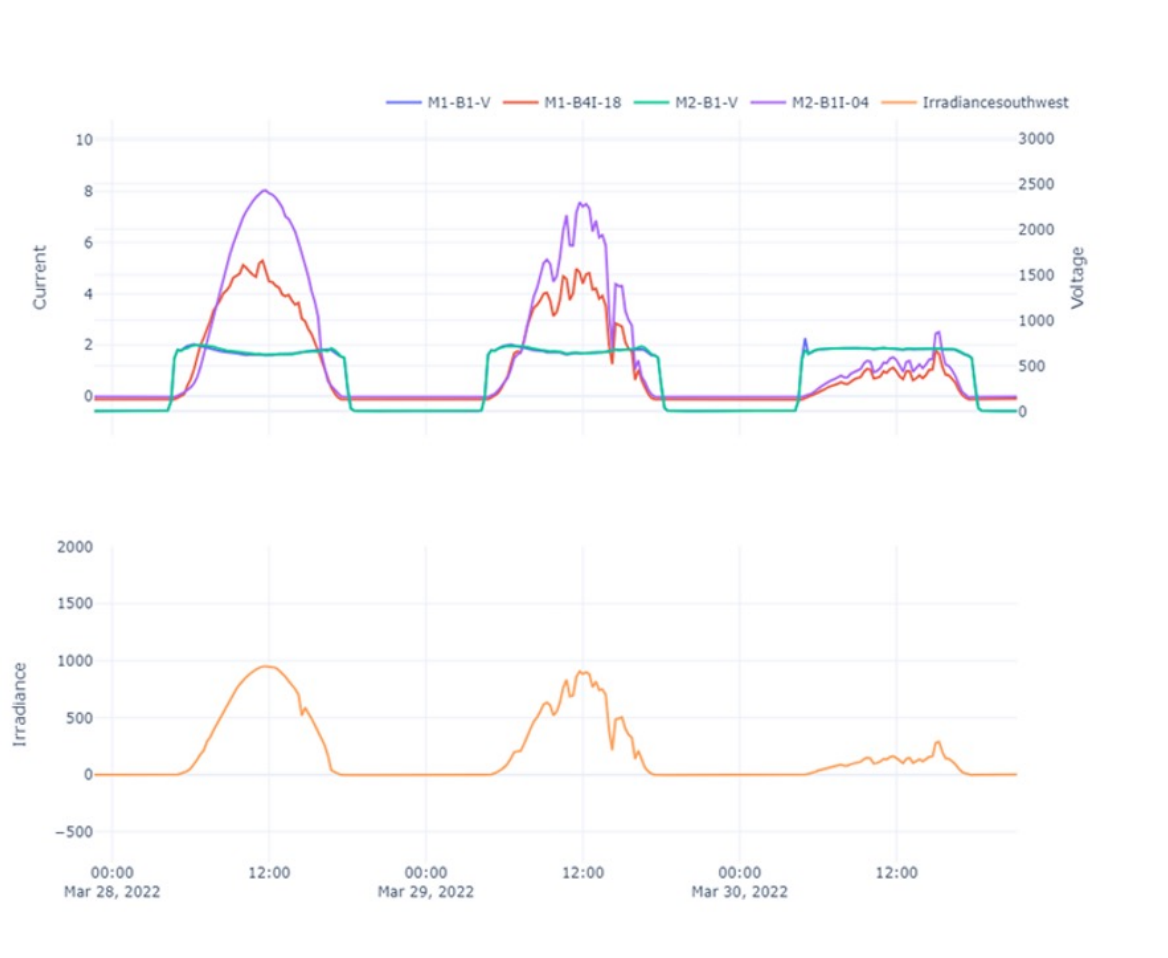
- Digital twin based on diode-equation
- Simplifications needed
- Low no. of data points
- Post-failure analysis & identification

AI & Machine Learning



- Correlation based analysis
- Automatically identify correlative patterns
- High no. of data points
- Pre-failure prediction possible

VERBUND X Accelerator: Cooperation with Smart Helio



PV module damage identified due to abrupt decrease of current

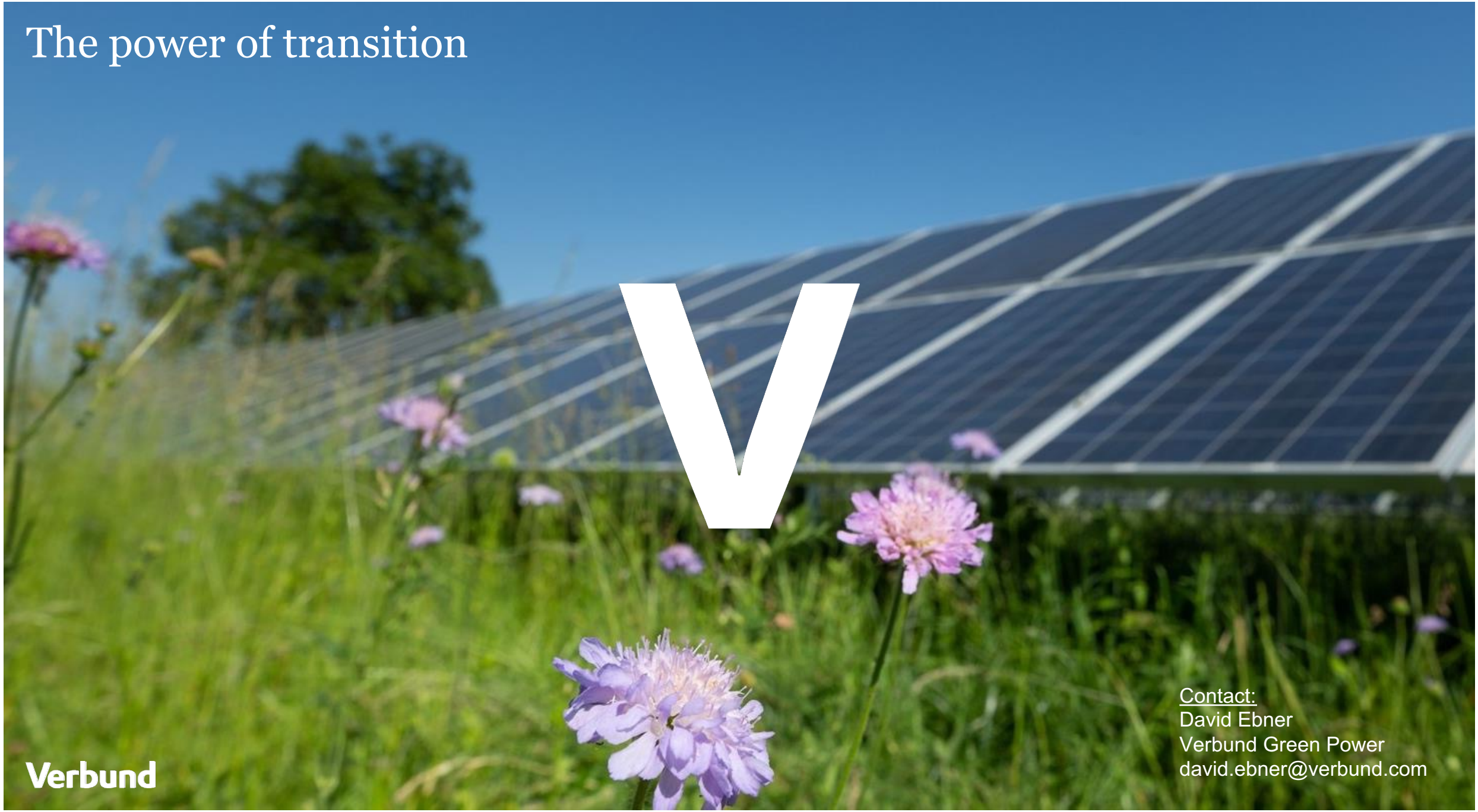
Case study:

- SmartHelio analytics on historical data of 2 VERBUND PV plants
- Identification of underperformance
- Classification of failure type

Example:

- PV Module damage identified
- Analytics allow identification **before** site visit
- Appropriate remedial action based on energy loss prediction and cost analysis

The power of transition



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Verbund

SmartHelio

THE DOCTORS OF SOLAR PV PLANTS

Intelligent Software That Prevents Downtime In Solar Plants

Certified B Corporation

This company meets the highest standards of social and environmental impact

Best for the World 2022

Y Combinator

Govinda Upadhyay
CEO & Founder

Lausanne, Switzerland | CA USA | New Delhi, India

Team from big data, software and energy

30+ members | 50% industry | 50% researchers

Govinda Upadhyay, CEO

- Serial entrepreneur
- **Climate Research**

Neeraj Dasila, CTO

- Co-founder
- **Big Data**

Maxine Cronier

- Head, Partnerships
- **Sustainable investment**

Shankaransh Srivastava

- VP, Marketing
- **Solar asset management**

Peter Gould

- VP, Operations
- **Cybersecurity**

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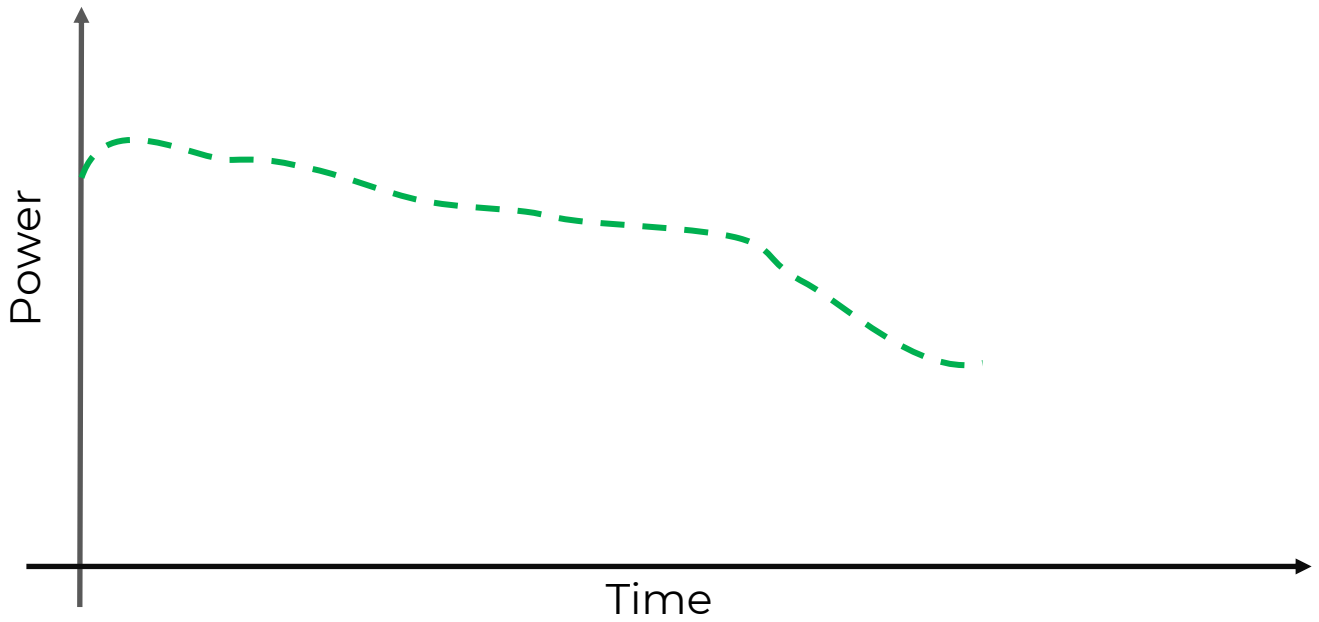
Real-time Fault Detection Software

Prevent downtime in solar PV assets using predictive analytics



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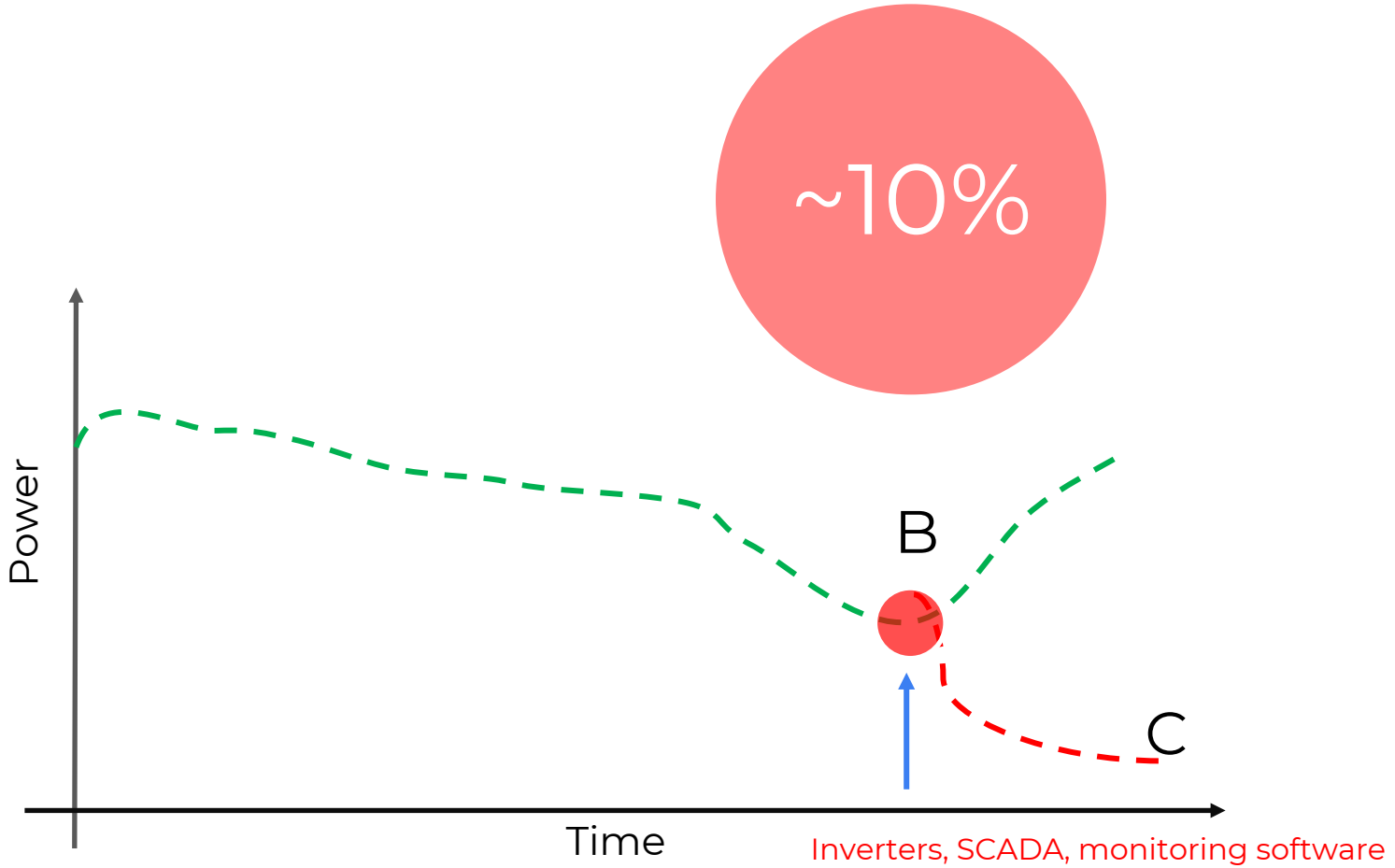

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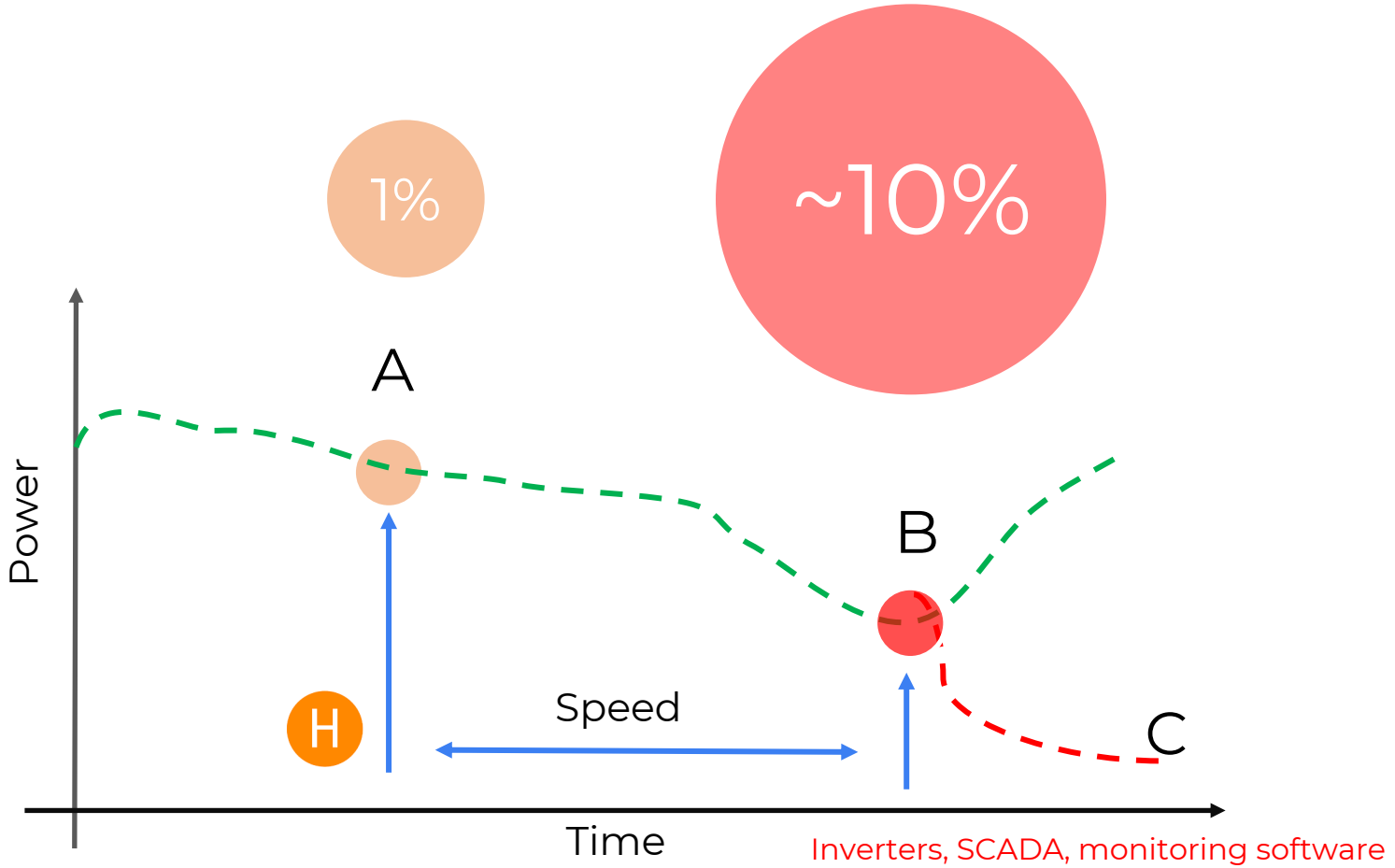

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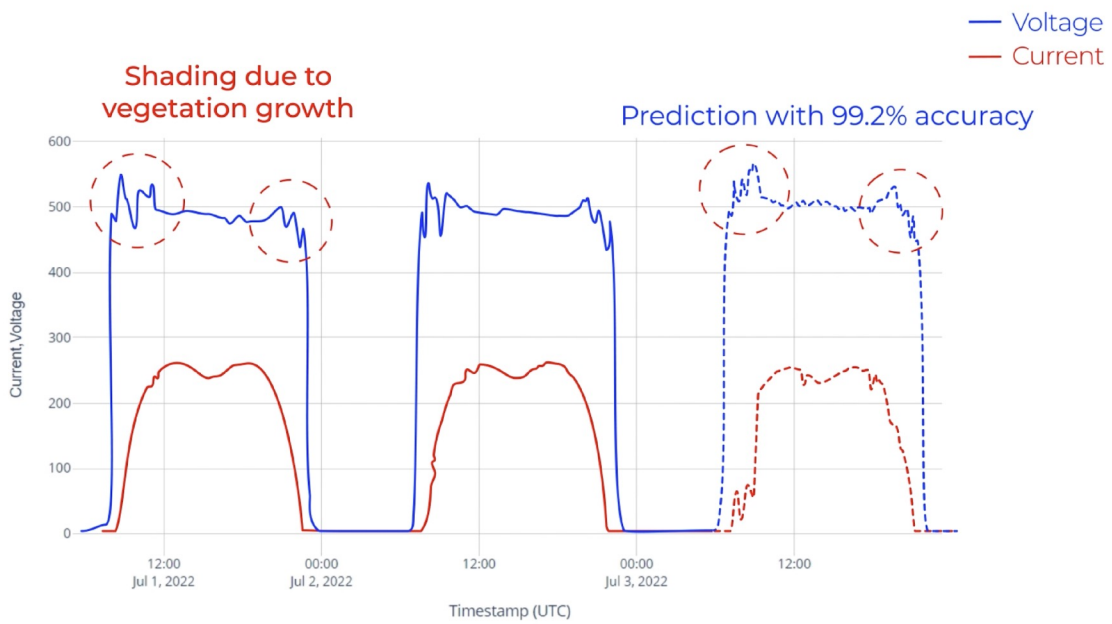
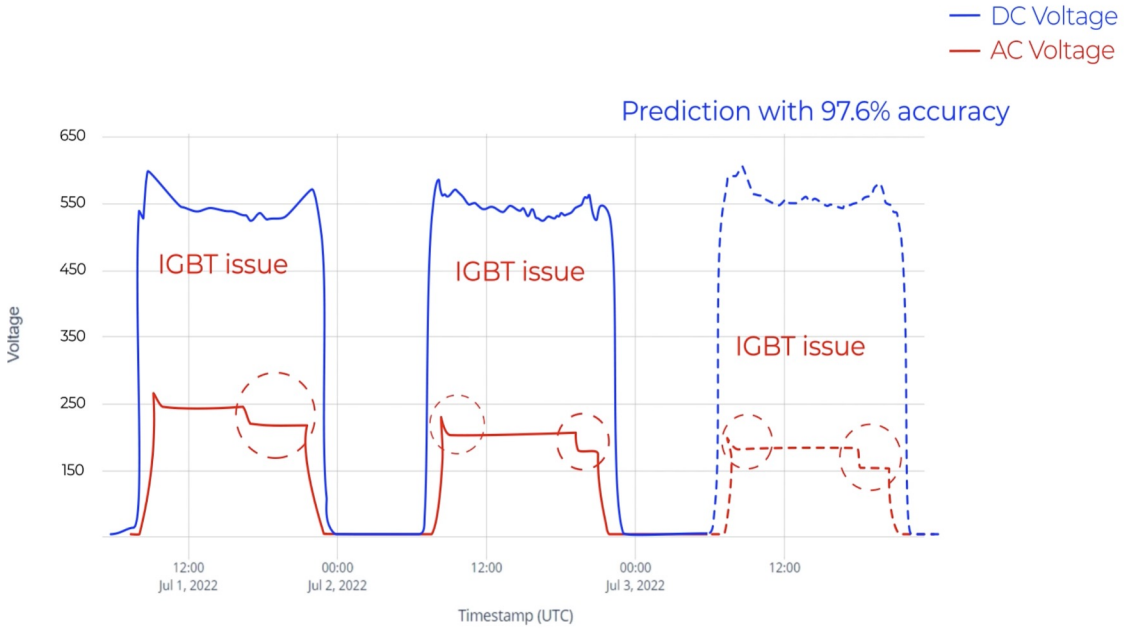
Physics-informed AI Models





- 50+ Physics based algorithms require 90% less data than usual AI systems
- Inverter failure, module level issues, connector/wiring issues, vegetation growth, tracker issues, shading, string disconnection, bad data, weather data etc.
- Highly scalable. Provide results from day 1. No Blackbox.

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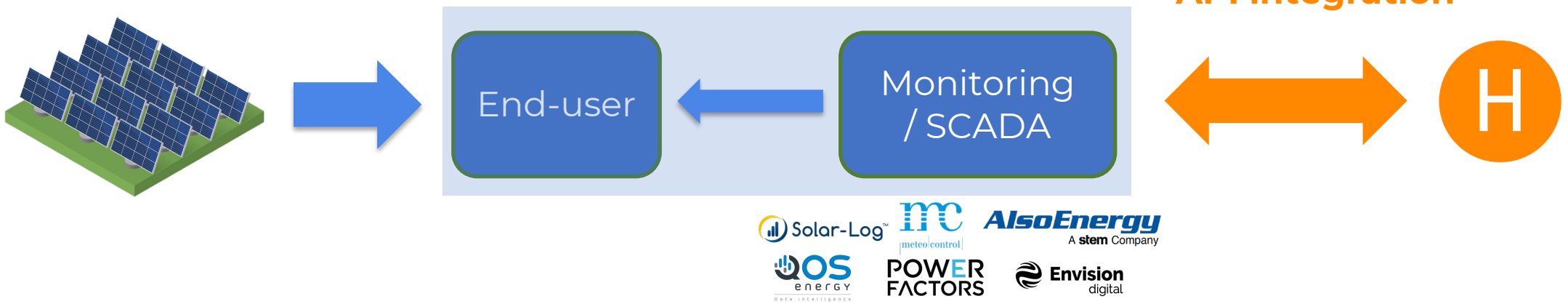
Integrate to your Existing Software

Revenue Model: SaaS, Licensing, Pay per Fault

AI-driven automated plant onboarding



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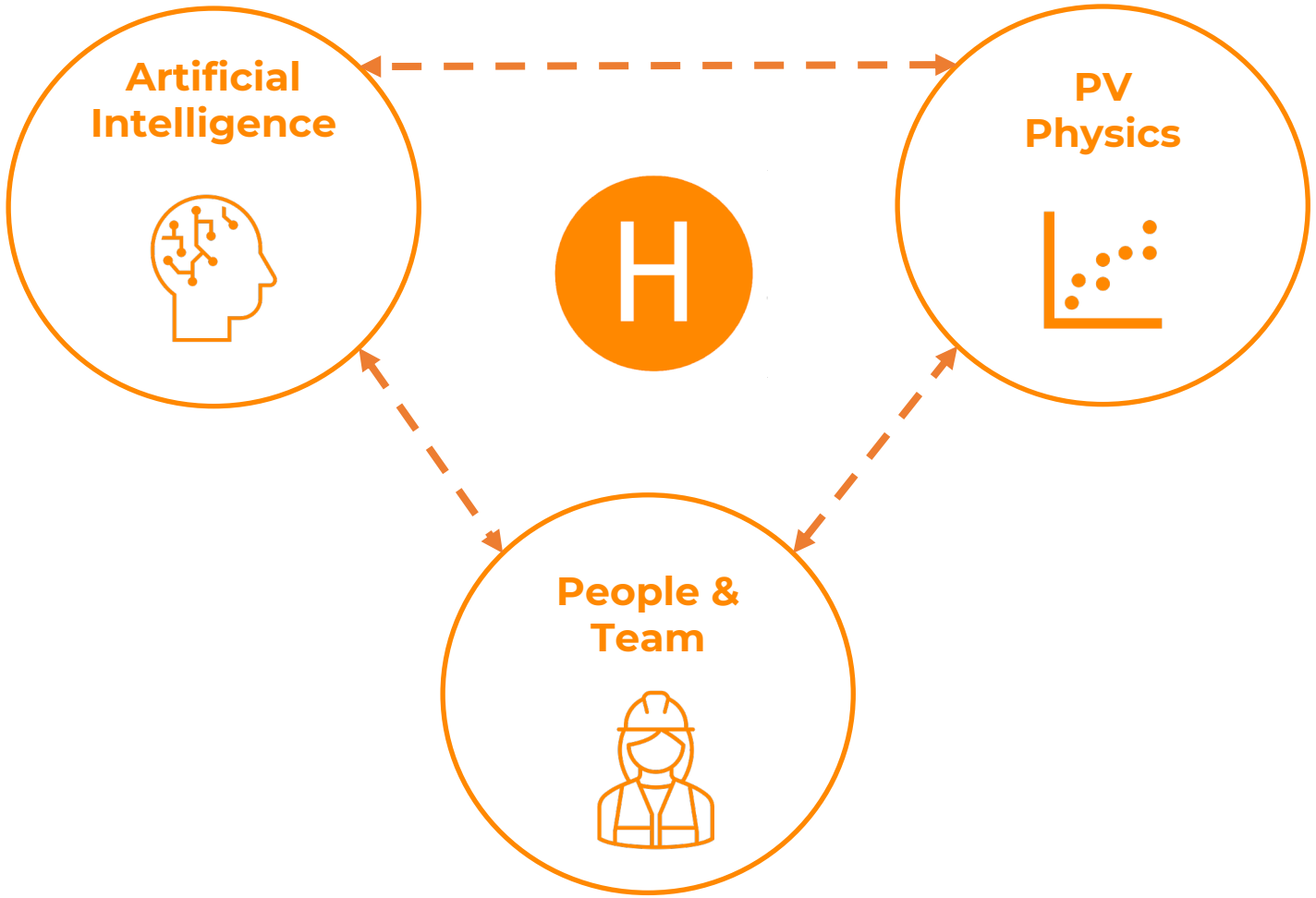
Physics–Informed AI to Empower People

Trust

Transparency

Truth



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Q&A

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Tuesday, 6 June 2023
2:00 pm – 3:00 pm EDT, New York City
8:00 pm - 9:00 pm CEST, Berlin

Approaching bankability for grid-scale energy storage

Thursday, 8 June 2023
10:00 am – 11:00 am EDT, New York City
4:00 pm - 5:00 pm CEST, Berlin

Grid-forming inverters: What advanced grid functionalities should inverters offer?

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Anne Fischer
Senior editor
pv magazine

Thank you for joining today!