



Transforming power.

Power systems need better data & precise control.

Sudden and unbalanced voltage fluctuations, high harmonic distortion and poor power factor commonly disrupt network operations and industrial power users alike.

These issues don't just cause inefficiencies – they threaten network uptime and cause major economic losses.

A myriad of technology solutions have been developed to address some of these symptoms in isolation.

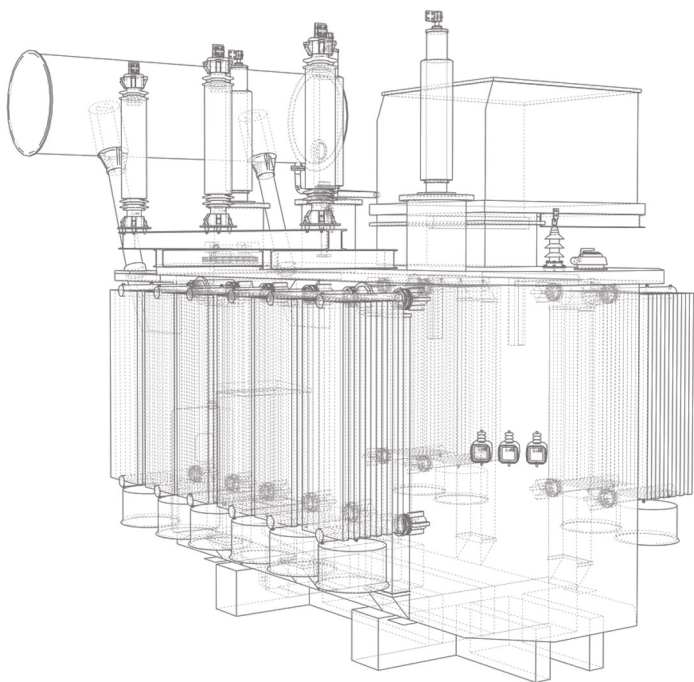
At IONATE, we decided to fix the cause.



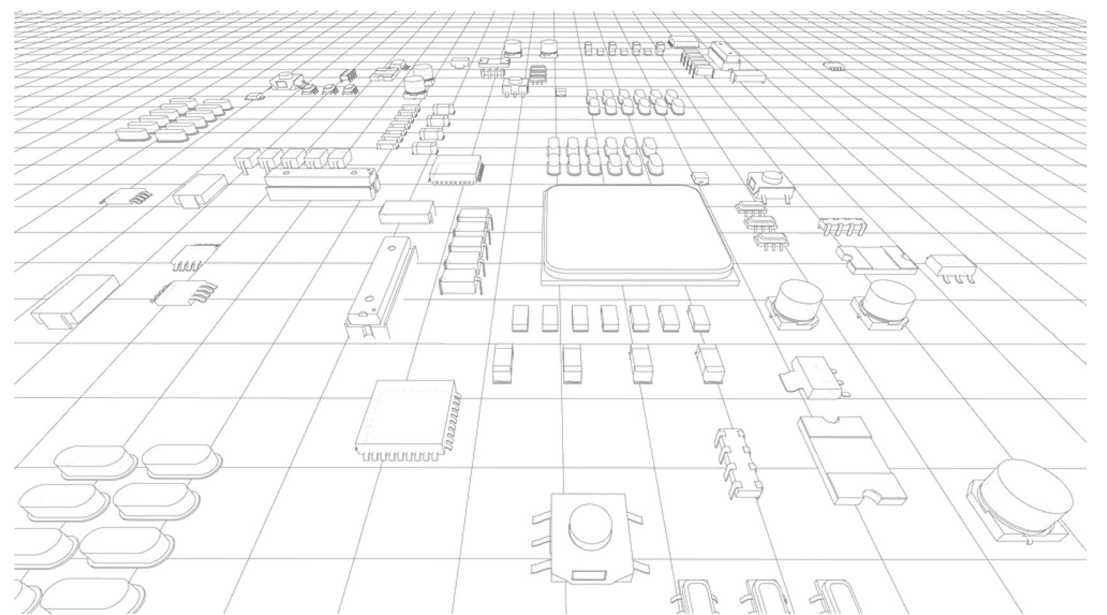
IONATE is building the hardware-software backbone for the smart grid.

We are deep-tech innovators building a full-stack systemic solution.

Hybrid Intelligent Transformer



Aurora Neuralis Platform



First-of-a-kind control device for millisecond-precision.

Resolves challenges **reliably & affordably**

Serves as one device for **comprehensive control**

Provides **real-time visibility**

Built for the fastest reaction times in asset management.

Gives system-level **insight**

Enables coordinated control = systemic **flexibility**

Unlocks balancing services **revenue** streams

The Hybrid Intelligent Transformer (HIT)

The precision and speed of electronics...

Voltage control: stepless, bidirectional, phase-independent

Ensure stability and finely balance power usage in real-time.

Harmonics suppression: both V&I THD <1%

Shield sensitive assets from power-related wear and damage.

Reactive power control: to unity, leading or lagging.

Maximize efficiency, reduce power losses, and balance the system.

Real-time data: for analytics and remote control.

Determine setpoints or set rules in real-time via your SCADA/ADMS or another platform – like the IONATE Aurora Neuralis.

...merged with the robustness of a transformer.



Tx footprint:
Power electronics stay small

Tx reliability:
Electronics galvanically isolated

Tx efficiency:
Hybrid design >99%

Achieve all-in-one power conditioning from the transformer

With waveform-level monitoring, the HIT detects any disturbance before it can pass down and cleans it up in real-time.

Unlike passive transformers, HITs continuously shield all downstream equipment from a range of power quality issues.

At the same time, its bidirectional control protects infrastructure and keeps the grid within operational constraints, allowing for more DERs and system complexity. There's no need for extra sensors or other hardware add-ons.

The HIT helps you maximise flexibility and resilience of your network in one smart building block.

Fragmented Tech Stacks

Transformer
Tap-changers

Sensors,
Monitoring systems

Harmonic Filters

Capacitor banks
Reactors
UPFC
STATCOM
SSSC
SVC
DVR

replaced with

Voltage step

Real-time data

Harmonics
suppression

Dynamic power-flow
control

Power factor correction

a Swiss Army Knife

HIT

HITs are built by your trusted OEM

HITs are built to **your transformer specifications**, in adherence to grid code.

Your preferred manufacturer builds the custom transformer core and connects the IONATE brain. The unit gets tested, delivered, and supported in the field by your trusted OEM.

It is connected into the substation just like a transformer.

...but with all the intelligence and control deployed.



Type	Dry type / Liquid Filled
Phases	3
Frequency	50 / 60 Hz
Rated Power	Up to 3MVA
MV Range	Up to 72kV
LV Range	Up to 480V
Location	Indoor / Outdoor
Response	<<1ms, Stepless
Independent Phase Voltage Control	Design feature (e.g., +/- 10%)
V&I Harmonics Compensation	Up to 99 th
Reactive Power Compensation	Design feature (e.g., four quadrant 250kvar)
Load Imbalance Compensation	Up to 15%

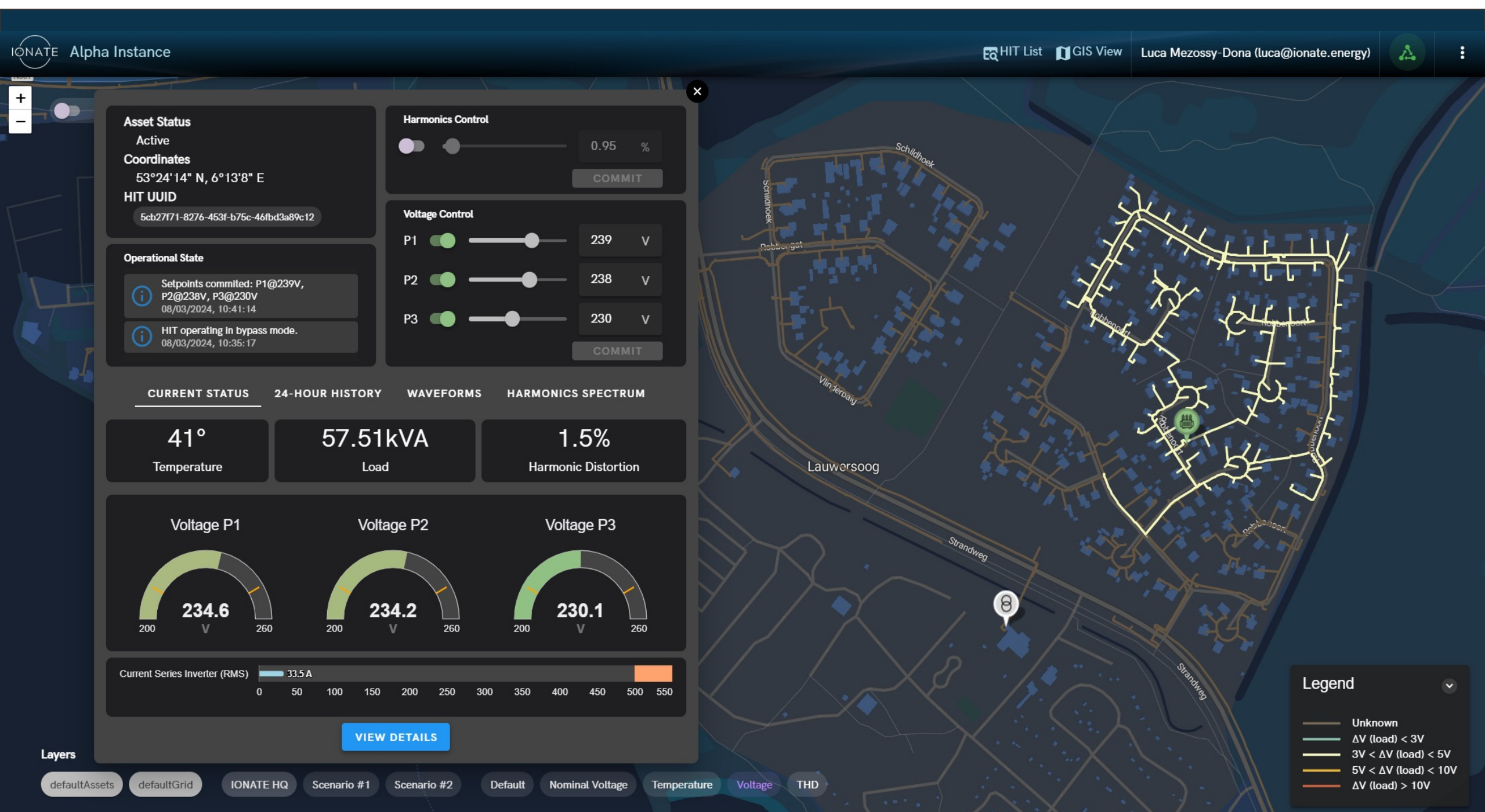
Unlock intelligent control with IONATE Aurora

HITs work as intelligent control nodes. They stabilise their local power flows autonomously or can be managed through an existing platform.

Using IONATE's AI-enabled Aurora, multiple HITs can be coordinated, which will allow you to **manage power flows on a network level.**

The bottom-up device-level control integrated with the top-down optimal power flow management complement one another's objectives.

This full-stack network optimisation **delivers system balancing with real-time precision.**



We build for networks that optimise themselves

Our vision has never just been to sell devices. HITs were invented as a means to solve a bigger problem: **organizing systemic power flows in the smartest way.**

Upgrading networks with IONATE technology unlocks inherent flexibility and resiliency. A network with HITs using Aurora enable on average:

33%

More DERs

25%

More system capacity

6%

Reduction in losses



We're working with industry pioneers.

The first HIT devices have been built and fully tested to go into live infrastructure trials this year. Some of our projects include:



Grid pilots in Portugal & Spain



Renewables pilot in Austria



Data centres & microgrids



Sounds interesting?

We'd love to hear from you and explore project collaborations.



info@ionate.energy



[ionate.energy](https://www.linkedin.com/company/ionate.energy)



www.ionate.energy



Selected from
1500+ deep-
tech
innovators



Best Startup, as
chosen by the
CIRED committee.



"groundbreaking
innovation"



"impact which is
pretty much
unheard of"