HIBILTER · HUMAEL — WHITE PAPER

Humael Urja

Energy as a real-time decision: NILM, forecasting, V2G and demand response

One of your largest controllable costs is nearly invisible until the bill lands. Real-time energy intelligence moves the decision back to where it still matters.

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EXECUTIVE SUMMARY

Energy is one of the largest controllable costs most operations carry and one of the least visible — discovered only when the bill arrives, long after anything could be done about it. This paper describes how real-time energy intelligence turns consumption from a monthly post-mortem into a live decision, using appliance-level disaggregation (NILM), site-level forecasting, EV smart-charging and vehicle-to-grid, and demand response. The same system that lowers cost and peak load produces the evidence behind credible ESG reporting.

The invisible cost

Energy is unusual among major costs: you commit to it continuously but only see it monthly. Most operations discover what they spent when the invoice lands — long after the moment they could have intervened. A failing chiller draws more power for weeks before anyone notices; a peak-demand charge is set by a single fifteen-minute window nobody was watching.

The problem is not a lack of data — meters produce it constantly — but a lack of timely visibility you can act on. Energy management built around monthly reports is, by construction, a post-mortem.

Move the decision back in time

Humael Urja turns energy into a real-time decision. Instead of a monthly reconciliation, you see consumption and cost forming across every site as it happens, and you can intervene while it still matters. That single shift — from reporting to acting — is what unlocks the savings that monthly cycles leave on the table.

Three levers most teams leave unused

- **Appliance-level detection (NILM).** Non-intrusive load monitoring infers what individual equipment is doing from the aggregate energy signature, so a degrading chiller or a stuck compressor is caught from its electrical fingerprint — without instrumenting every device.
- **EV smart-charging and V2G.** Schedule fleet charging around price and load to avoid peak tariffs, and turn parked vehicles into a grid asset through vehicle-to-grid, earning revenue from capacity you already own.
- **Demand response.** Shave peak load automatically and monetise the flexibility you already have by participating in demand-response programmes.

Forecasting changes the question

Visibility tells you what is happening; forecasting tells you what is about to. When you can predict spend and peak load before the bill lands, energy management stops being reactive. You can pre-cool ahead of a price spike, stagger loads to stay under a demand threshold, or shift fleet charging to the cheapest window — decisions that are only possible before the fact.

> *If you could watch your energy spend forming in real time, the only question left is where you would cut first.*

One system, two outcomes: cost and ESG

Sustainability reporting and cost reduction are usually pursued as separate initiatives, often by separate teams, sometimes with separate tools. Urja collapses them. The same meter data, disaggregation and forecasting that lower your cost and peak load also produce the auditable evidence behind your ESG and sustainability reporting.

For a COO or sustainability leader, that is not two projects but one: lower operating cost, lower peak demand, and a credible, evidence-backed sustainability story — from a single system rather than a reconciliation of three.

What the operator measures

Real time
visibility of every watt, every site

Forecast
spend and peak load before the bill

NILM
appliance-level fault detection, no full instrumentation

Revenue
from V2G and demand response flexibility

Deployed on live data

Urja is not a concept. It runs on live site data, in the cloud or on your own infrastructure, so savings are modelled on your meters rather than a brochure's assumptions. For sites with operational-technology constraints, it deploys inside the perimeter alongside existing building- and energy-management systems.

Conclusion

The reason energy spend feels uncontrollable is that it is measured too late to control. Make it visible and predictable in real time, add disaggregation, smart-charging and demand response, and one of the largest controllable costs in the business becomes exactly that — controllable — while producing the ESG evidence you needed anyway.