OPENARC
MISSION CONTROL

Energy Planning Without Barriers

From Regional Vision to National Action

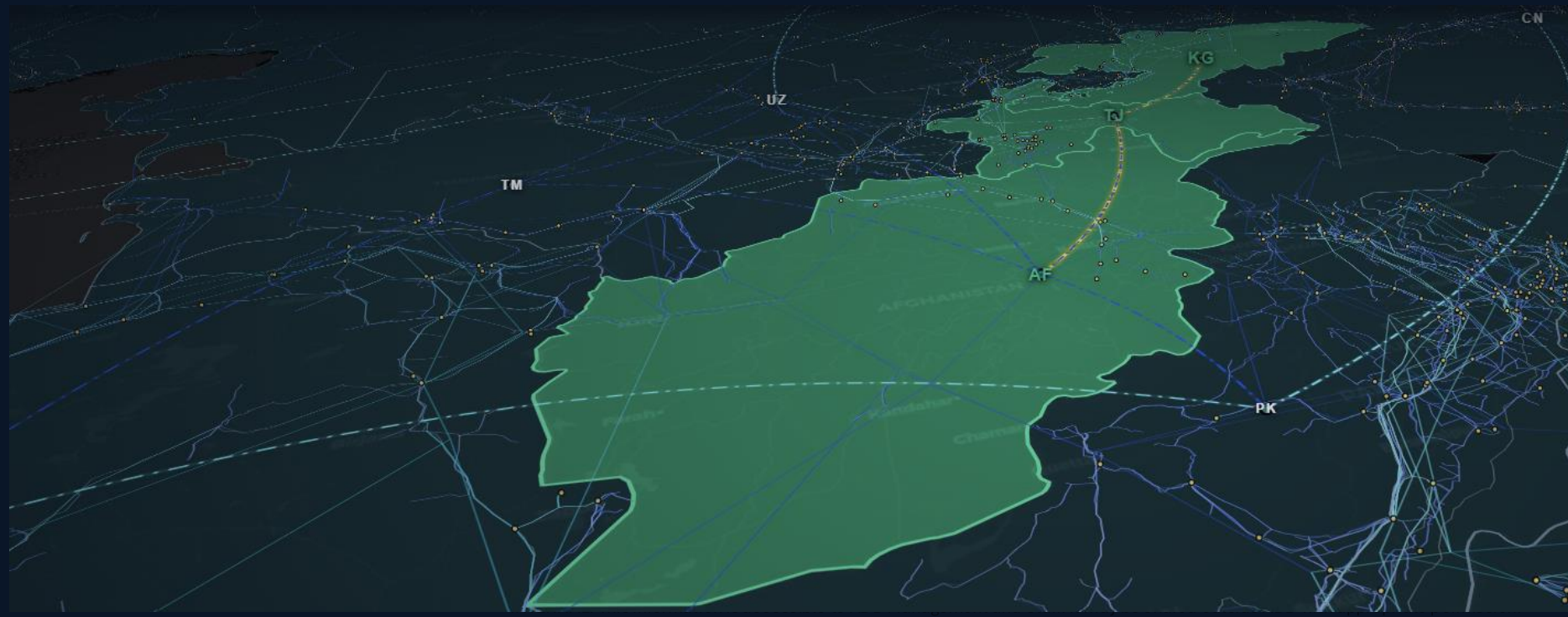
THE SOLUTION

First Unified Global Energy Optimisation Platform

Production-ready infrastructure: market and network now extended to 120 countries across CAREC, EU and Africa

What the Platform Does

Solves the regional economic dispatch problem hour by hour for an entire year, deciding how much each power plant generates and how much electricity flows across transmission links, with the same engine extended to 120 countries (CAREC, EU, Africa) for cross-regional analysis.



MISSIONS 8 available

Stress-test demand growth
Scale demand on selected countries; see where the system bends.

Test a fuel price shock
Push gas, coal, oil prices and watch dispatch reshuffle.

Explore congestion
Find the choke-points: which corridors saturate first?

Evaluate a new interconnector
Add a corridor; estimate welfare gain via CBA.

Run capacity expansion
Co-optimise new generation, storage, and transmission.

Compare country data versions
Show what changed in a country's template — line by line.

Create CBA assessment
TYNDP 2024 welfare decomposition for a regional project.

Browse my scenarios

PLATFORM TOUR

Mission Control — Immersive Energy Atlas

A 3D world view of the global power system. Every plant, every transmission line, every cross-border flow — visible, queryable, and linked back to the model.

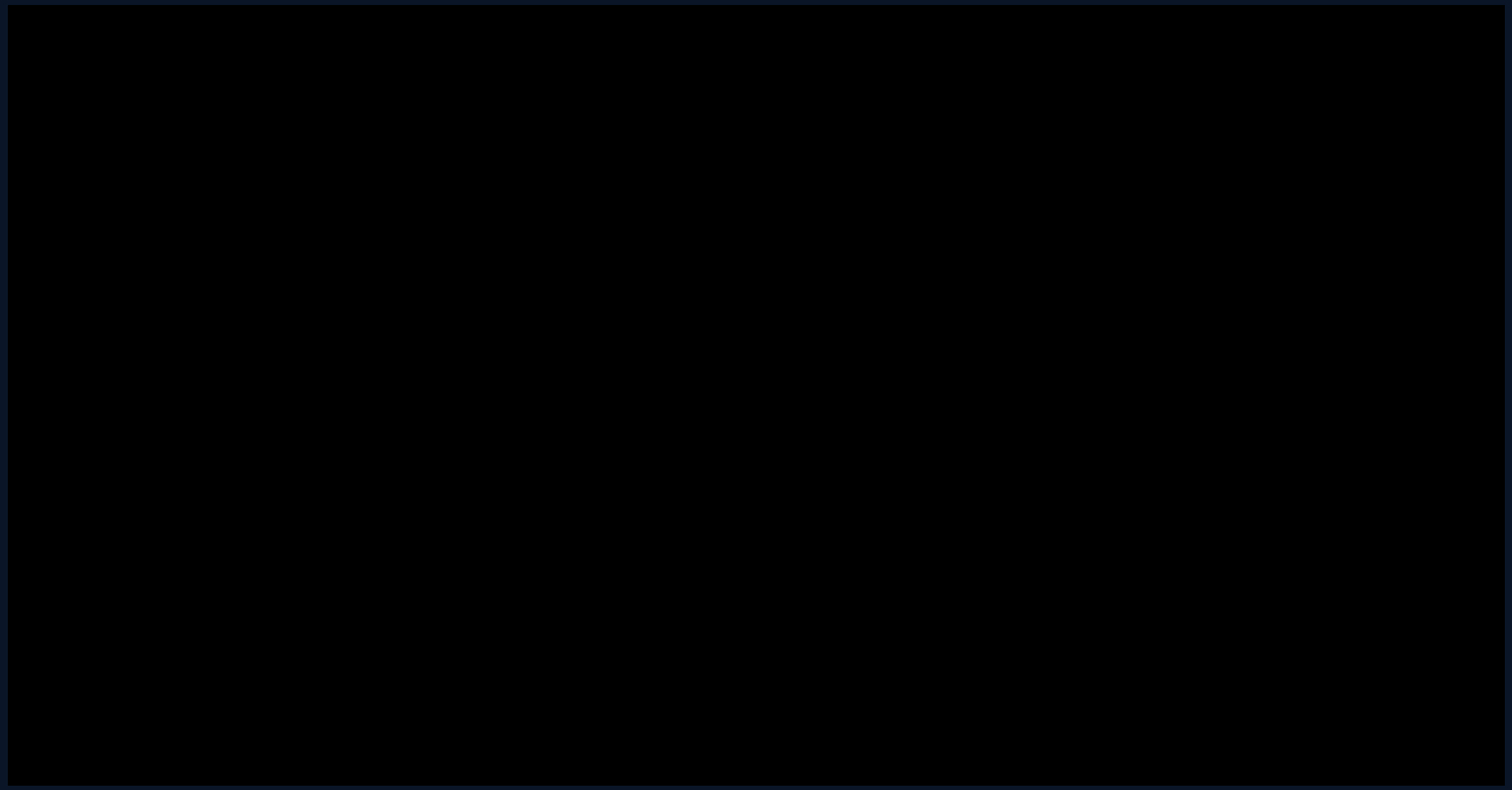
Optimizing by click

- 41,625 Power Plants
- 580,000+ HV Lines
- 122 Countries
- Voltage palette 110–1150 kV
- Animated cross-border arcs
- 120 with sub-national national grids
- Open-Meteo / ERA5 weather

“From a boardroom narrative to a ground-truth network, in two clicks.”

PLATFORM TOUR

Mission Control — Immersive Energy Atlas



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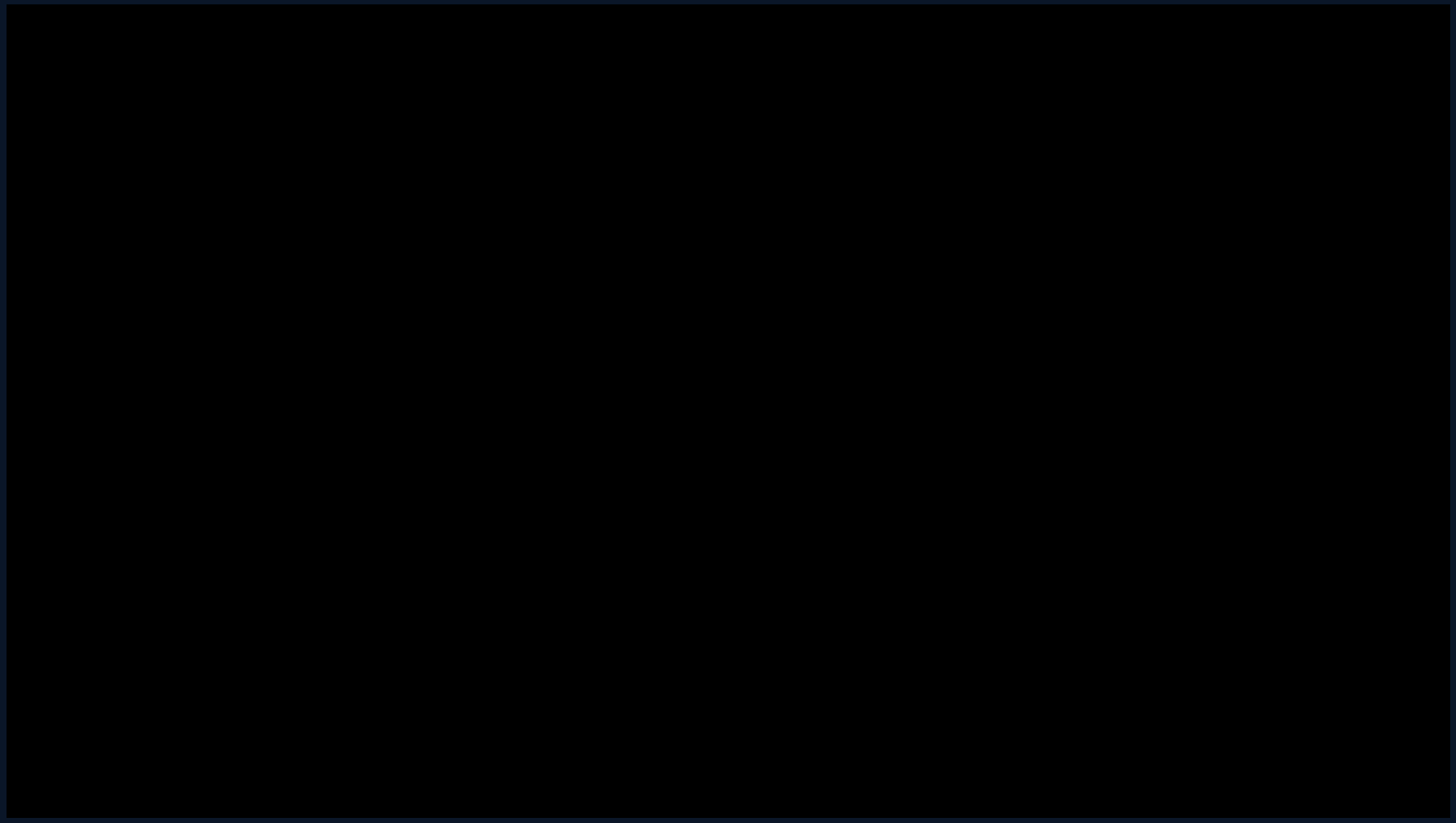
Build your layer of market intelligence on top of real data

PLATFORM TOUR

Track progress in real time

PLATFORM TOUR

Let OpenArc guide you through key market intelligence



PLATFORM TOUR

Data Marketplace — Country-Owned, Version-Controlled

Each country owns its own data templates. Every change is logged, diffable, and reversible. Sovereignty is built in, not bolted on.

STRUCTURE

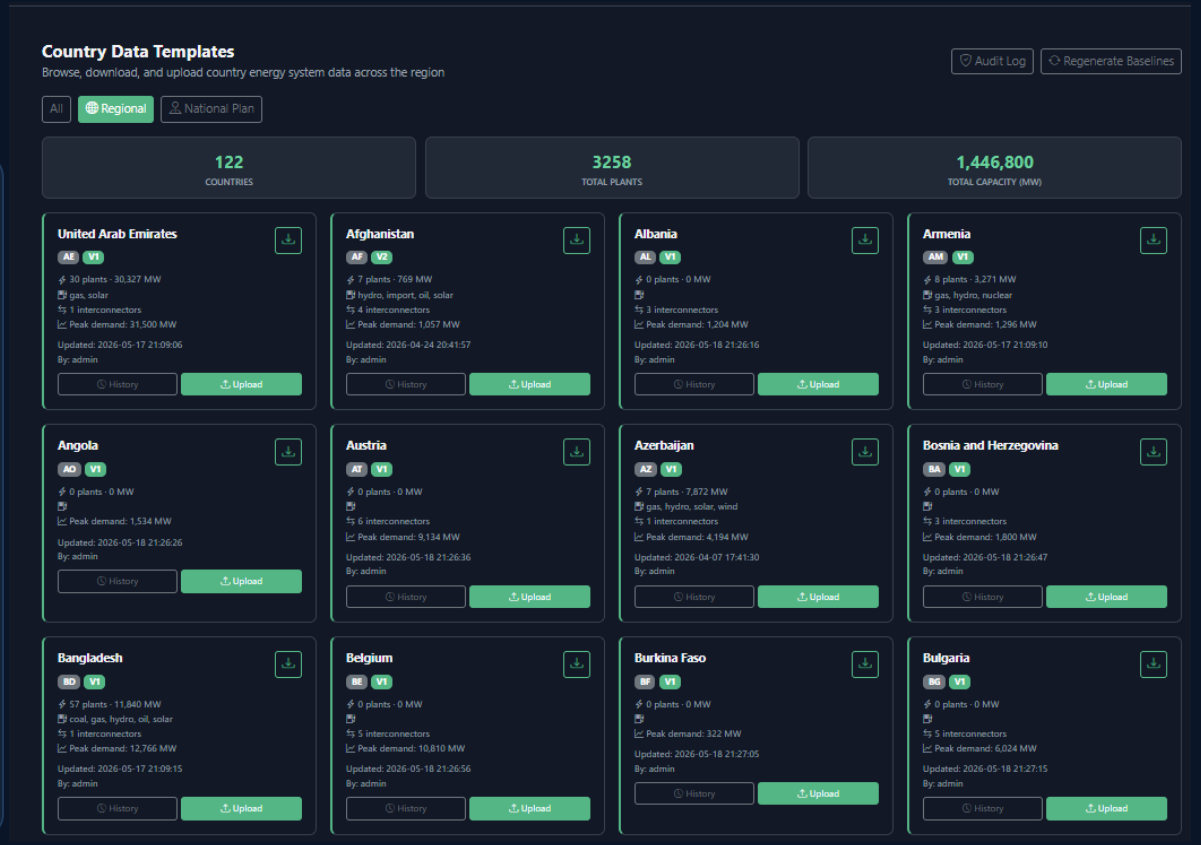
7-Sheet Country Template

- Country_Info (VOLL, peak)
- Generators (unit-by-unit)
- Battery_Storage
- Transmission (NTC / lines)
- Fuel_Prices
- Demand_Profile (hourly)
- VRE_Hydro_Profiles

GOVERNANCE

Versioning + Audit Log

- Visual side-by-side compare
- Highlights changed cells
- Full audit log per template
- Reversible to any prior version



“Inputs you own. Changes you can prove. Versions you can revert.”

PLATFORM TOUR

Cost-Benefit Assessment

Bankable project economics computed from the same dispatch model. PINT / TOOT methodology, five indicators, hourly welfare attribution.

APPROACHES

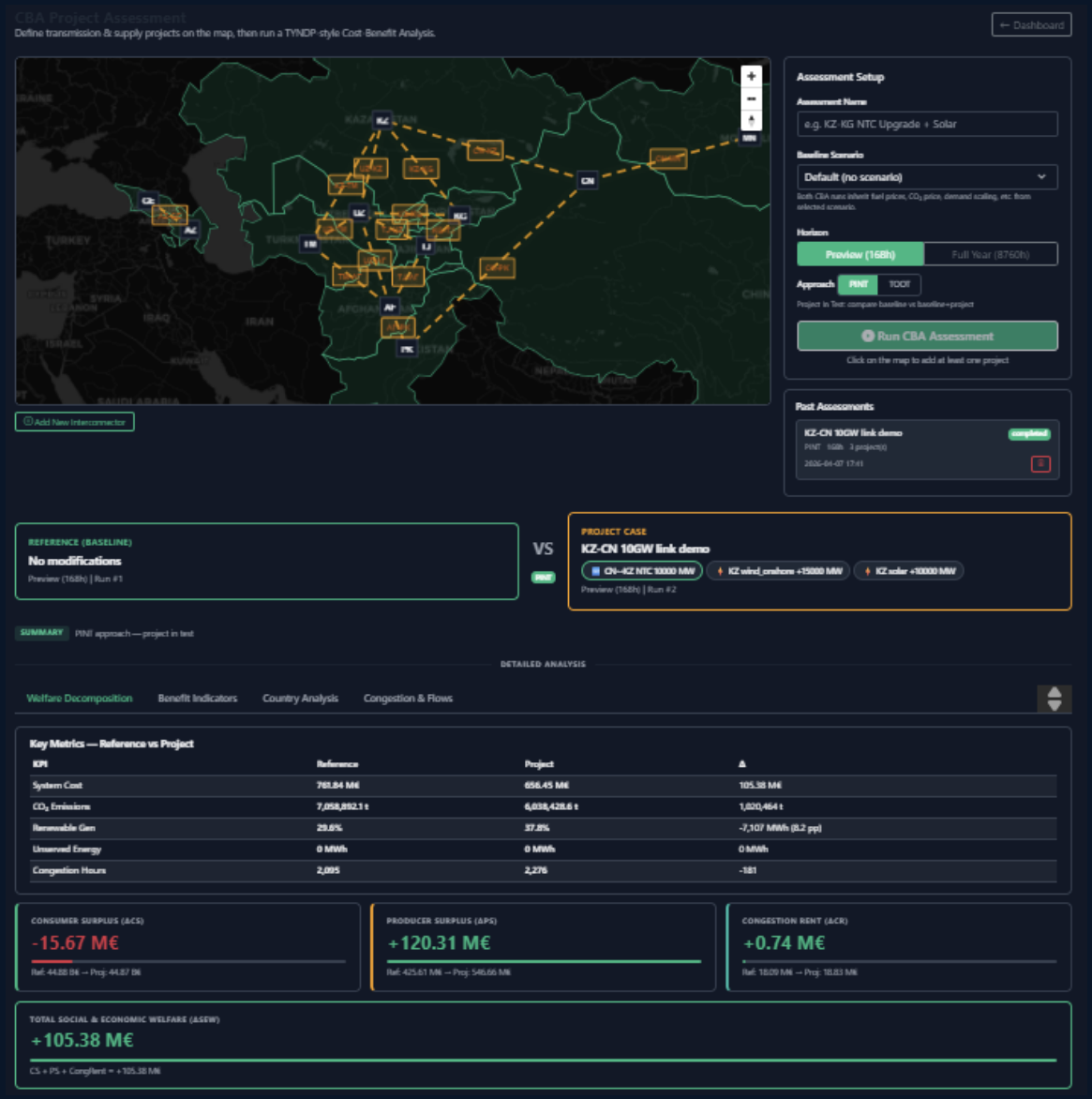
PINT & TOOT – TYNDP aligned

- PINT: Project IN: baseline vs baseline + project
- TOOT: Take Out One at a Time: baseline + project vs baseline
- Auto-pairs scenarios + runs both
- Same engine, no methodology gap

INDICATORS

5 Benefit Categories

- B1 SEW: Socioeconomic Welfare
- B2 CO_2 : Societal premium (SCC €20–100/t)
- B3 RES : Renewable integration (GWh)



“Every benefit traced back to the dispatch hour that produced it.”

PLATFORM TOUR

Long Term Capacity Expansion

Co-optimise new build across generators, storage, and transmission under budget caps and renewable targets. The same LP engine; longer horizon, more decision variables.

CANDIDATES

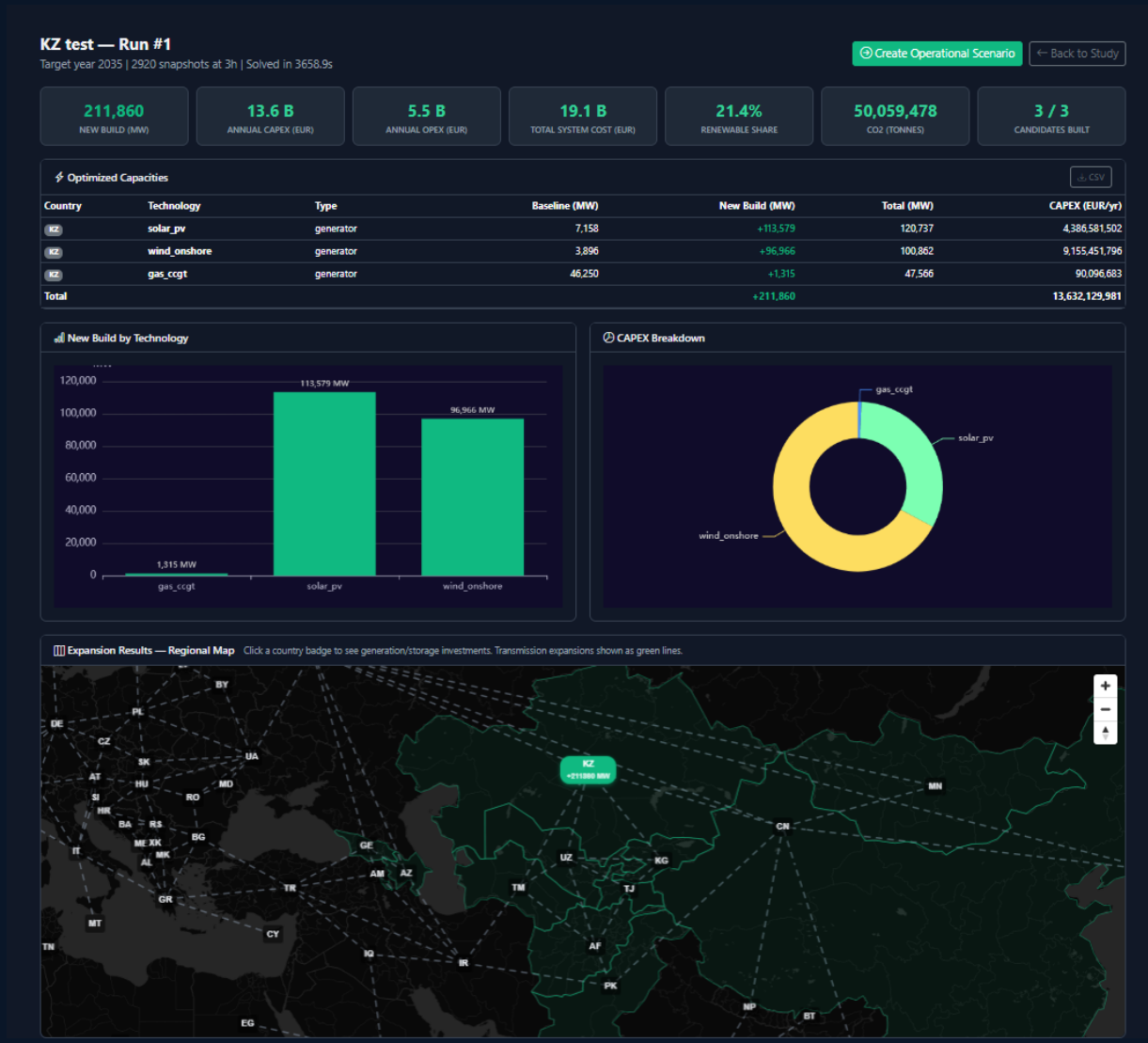
Reference Technology and Financial data

- Solar PV, wind onshore / offshore
- Thermal gas, thermal coal
- BESS 4h, 8h, 24h long-duration
- New transmission links
- Overnight CAPEX €/kW
- Lifetime by technology

COSTS

Policy Levers

- Total budget cap (€)
- Renewable energy target (% gen)
- Optimal MW per candidate
- System-cost trajectory
- Plant-by-plant build plan
- One-click → operational scenario



"From scenario to investment programme in a single workflow."

NETWORK STUDIES

Network Studies — Validating the Physical Grid

From economic dispatch to the physics of the network. OpenArc rebuilds a power-flow network from the model's own dispatch, proves it reproduces those flows, then runs a full grid-study stack.

STEADY-STATE

Power-Flow & Security

- DC load flow, I^2R losses by country
- N-1 contingency security (LODF watch-list)
- PTDF sensitivity + flow decomposition
- dNTC: transfer capacity at a border
- AC voltage profile + map heatmap

DYNAMICS & FAULTS

Stability & Short-Circuit

- Technology-typical generic machine models
- Rotor-angle (transient) stability analysis
- Connection / hosting-capacity study

"The same network the market dispatched, now stress-tested as physical hardware."

Outcomes | Stability Graphs

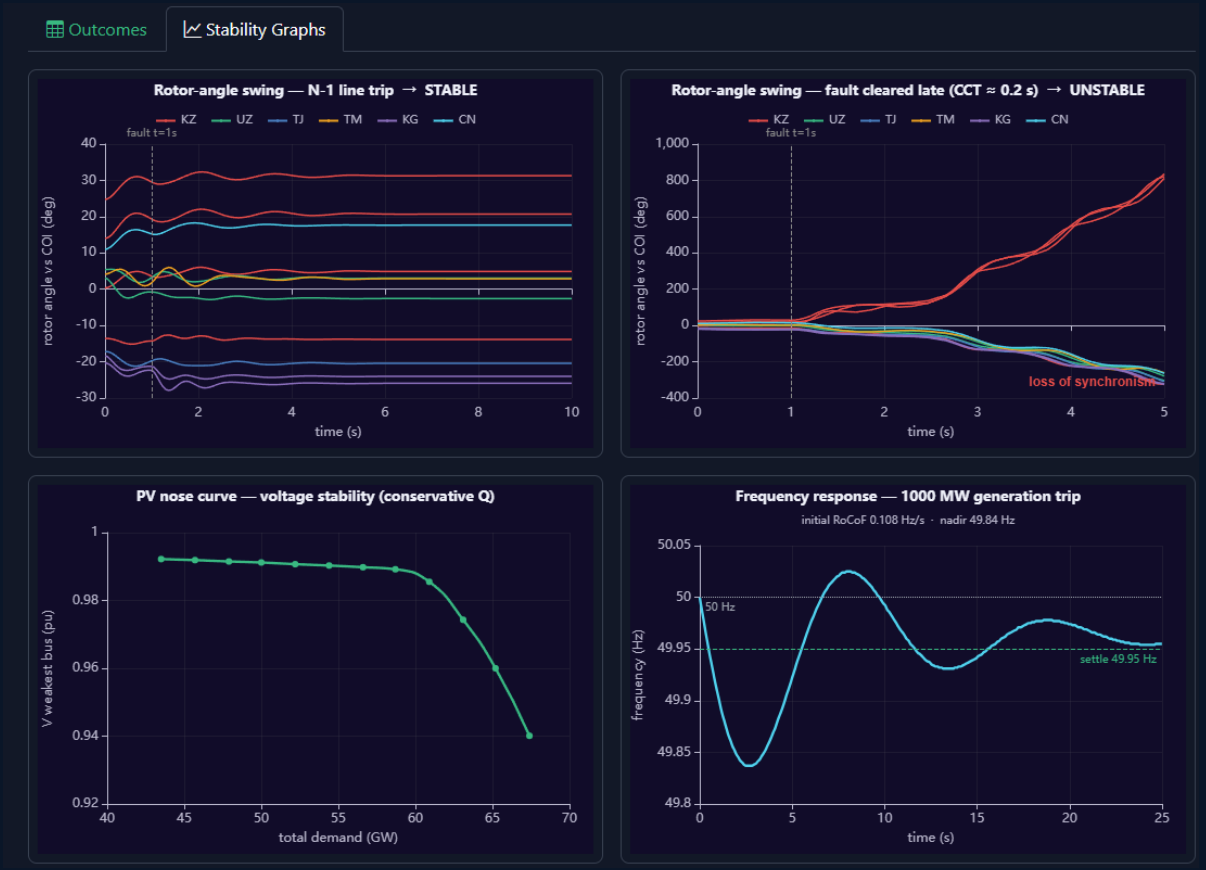
Stability outcomes

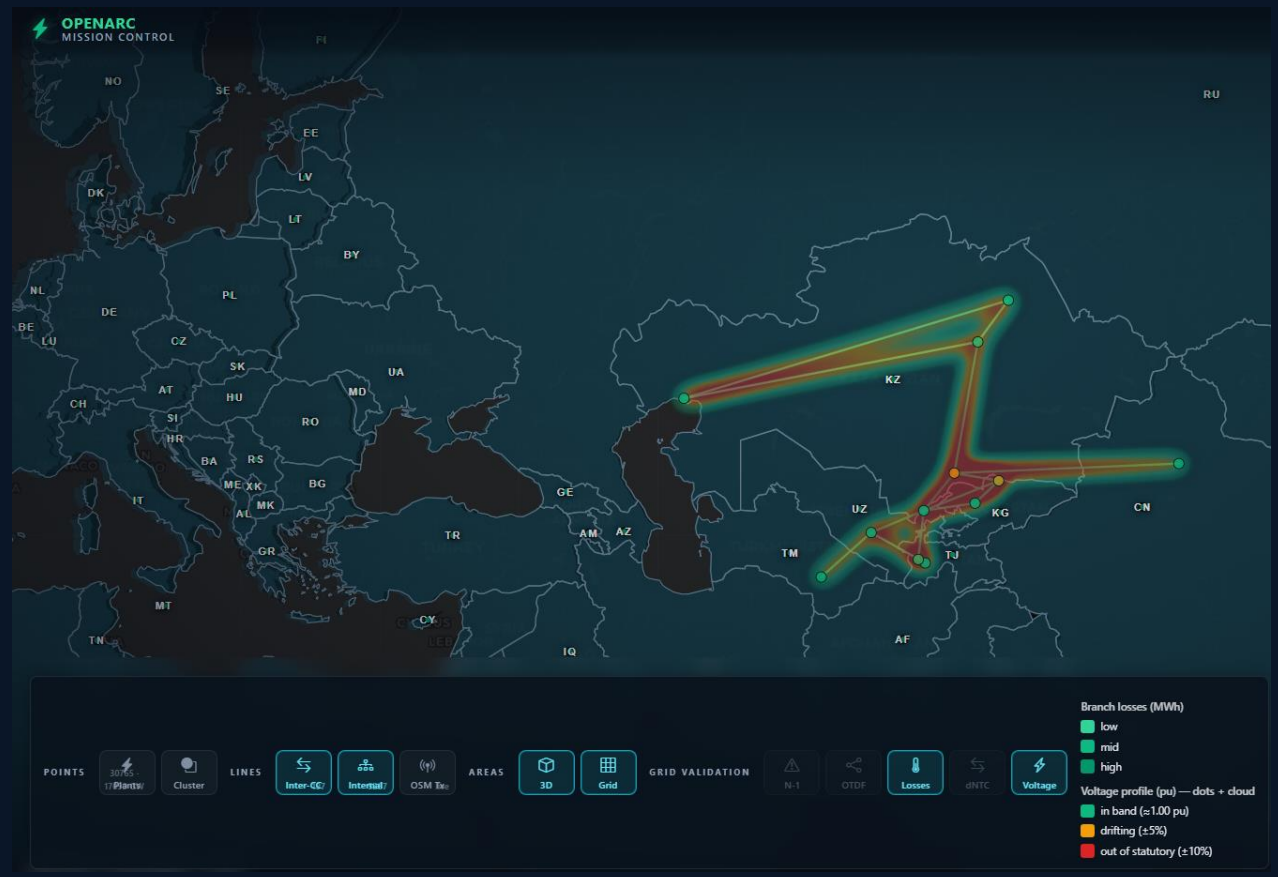
Analysis	Result	Tier
Voltage stability	Loadability margin +55% before voltage collapse (conservative reactive limits); weakest bus KZ-South @ 0.94 pu.	T2
dNTC (cross-border)	CN→KZ 2807 · KZ→UZ 2827 · TJ→UZ 6317 · TM→UZ 3102 · KG→KZ 3500 MW (indicative cutset NTC).	T2
Frequency stability	Inertia H 3.67 s (230 GW·s, 62.8 GW synchronous). 1000 MW trip → RoCoF 0.108 Hz/s, nadir 49.84 Hz, settle 49.96 Hz.	T2
Transient / rotor-angle	N-1 line trips STABLE (first swing ≤ ~30°). A 3-phase fault on the KZ North↔Central coal-transit bus cleared late (> ~0.2 s critical clearing time) → loss of synchronism — the transient-stability bottleneck.	T2
Small-signal	Inter-area mode ~0.15 Hz, damping ~12% → well damped (small-signal stable).	T2

Connection study — 1000 MW Wind-Onshore — Kazakhstan (South KZ)

Most-affected corridor	**KZ-South → UZ-Tashkent at 24% (+5 pp)**
New thermal overloads	**none**
Voltage impact	**negligible (~0 pu)**
Hosting headroom at the POC	**> 6 GW**
Short-circuit contribution	**~1.4 kA (IBR — current-limited, far below a synchronous plant of the same rating)**
Verdict	**Connectable with no 500 kV reinforcement**

Network Studies — Validating the Physical Grid





"The same network the market dispatched, now stress-tested as physical hardware."

PLATFORM TOUR

AI Assistant – Conversational Analytics, Local-First

Ask the platform in plain English. 15 analytical tools wired into a streaming chat. Runs on a local model — no data leaves your premises.

ASK

Natural-Language Queries

- "Loadshed in South Africa, scenario 17?"
- "Compare scenarios 12 and 18."
- "List Germany data templates."
- "Run a preview with +5 GW PV in Mongolia."

TOOLS

15 Analytical Tools

- list_my_scenarios / get_scenario
- query_loadshed / prices / emissions
- query_interconnector_flows
- compare_runs / get_results_summary
- create_and_run_scenario
- list_marketplace_templates

ARCHITECTURE

Local LLM, Streaming UX

- Served model on-premise
- Server-Sent Events for live tokens
- Tool-call traces visible to user
- No cloud dependency
- Data sovereignty preserved

AUDIT

Every Step Logged

- Full conversation history
- Per-message tool invocations
- Reproducible result trail
- Role-based access enforced

"A research analyst on call. 24/7. Inside your firewall."

IMMEDIATE VALUE

What the Platform Answers Today

Concrete policy and investment questions answered in seconds to minutes

Strategic Planning

What is the least-cost generation mix for the CAREC region?

Interconnector Economics

What is the economic value of upgrading the Kazakhstan–China interconnector by 500 MW?

Renewable Impact

How does a 5 GW solar expansion in Uzbekistan change marginal prices across the region?

Security of Supply

What happens to supply security in Afghanistan if Pakistan's demand doubles?

Carbon Policy

How does a carbon price of €50/tCO_2 shift the regional generation mix from coal to gas and renewables?

Network studies

How does an N-1 contingency on a key cross-border line reshape the regional flow pattern, shifting PTDF-driven flows, I^2R losses by country, and available dNTC at the border, while keeping the AC voltage profile within limits?

Project Cost and Benefit Analysis

What is the cost-benefit ratio of a new battery storage project in Kazakhstan using TYNDP methodology?

Every Question Becomes a Scenario

Each scenario produces full results: marginal prices, generation dispatch, cross-border flows, CO_2 emissions, adequacy metrics, and complete CBA assessment.

Building Energy Cooperation on a Foundation of Transparency

Are you ready to be part of the OpenArc journey?

Transparency

Open-source, auditable, reproducible

Trust

Verified methodology, shared understanding

Cooperation

Coordinated dispatch, shared benefits