HORIZON-CL5-2026-11-D3-23

GRIDTRACE–FM

Energy Foundation Model for Grid Dynamics



FIRST CONSORTIUM MEETING

Working proposal • 15 October 2026 •

42 MONTHS / IA

Agree the idea, divide the work, and set next steps.

Today: agree how the system works, who builds each part and how we test it.

01 The three things we want the AI to learn

02 SLD, measurements , 3p and data links

03 Work packages and partner roles

04 Timeline and immediate actions

05 Gaps

The funding opportunity

Data sharing to support the training and development of AI foundation models in the energy sector.

01 DEC

2026 deadline

IA

Innovation Action

42

Months proposed

€10m

Indicative EU contribution

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03 • WHY THIS PROJECT

The grid keeps changing. Our AI needs to keep up.

Switching changes what is connected. Measurements show how that new grid behaves. We want to learn from both.



Learn how a changing grid behaves

We combine switching information, actual electrical measurements and confirmed events.

What nodes measure

1-second voltage/current summaries, triggered 40 kHz waveforms and existing records

01

What is connected now

A dynamic single-line diagram, switch positions and phase details where needed

02

What actually happened

Operator feedback, fault records and how the network recovered

03

GOAL → Learn what changed, how the effects spread and whether the response was normal.

One changing grid. Three things to learn.

Track what is connected, how changes spread, and how the grid behaves.

ONE LIVING GRID MODEL

The same lines and substations remain, but switching changes their electrical connections.

We attach every node measurement to the grid arrangement that existed at that moment.



SIMPLE IDEA · What changed? → Who was affected? → Was the response normal?

Three linked views of the same changing grid.

One model tracks switching, a second tracks the links between areas, and a third learns normal and abnormal behaviour.

01 WHAT IS CONNECTED?

A switch moves a feeder to another source. The software updates its map without redrawing it.

The same assets keep their IDs.

Reclassify automatically after verified switching events.

02 + 03 IMPACT AND BEHAVIOUR

Which other areas are affected? How do voltages and currents normally behave after that change?

What looks unusual?

Learn its expected responses and deviations.

THE QUESTION

Can we recognize a normal source transfer without mistaking it for a fault?

See local changes — understand the whole grid.

Nodes measure continuously on-premises, send a summary every second, and upload detailed waveforms when triggered.

01

MEASURE

1-second values or 20ms
+ triggered waveforms
+ local triggers

→

02

UPDATE MAP

Switching changes
the SLD connections
→ phase-aware topology

→

03

LINK EFFECTS

See which other
areas are affected
with topology + context

→

04

CHECK RESPONSE

Learn the new normal
and spot unusual events
propagation and recovery

RESULT · Every signal is linked to the right component and the grid arrangement at that moment.

Who should build each part?

Suggested responsibilities for the consortium to confirm at this meeting.

1. Switching & grid map	**All research ?+ TSO/DSO model owners**	SLD import, phase links, changes and importance of each switch event
2. Nodes & measurements	**OEM + IOSDD utility field teams**	40 kHz capture, 1-second summaries, smart triggers and time stamps
3. Connect all the data	**IOSDD / Power View + utilities**	Link sensors and events to assets, SLD and the correct time
4. Three learning tasks	**IOSDD+ all research partners**	Learn changing connections, impacts on neighbours and normal behaviour
5. Test with utilities	**NTUA / Energy TEF + TSO/DSO operators**	Test real switching, unknown configurations and operator usefulness

MEETING DECISION → Name a lead and supporting partners for each task, plus available data and pilots.

Proposed research structure

Research Team A

Model 1 — Grid Changes

Universities 1 + 2

Learn how switching changes the grid, which configurations appear and which components become electrically connected.

Output: Grid configuration fingerprints

Research Team B

Model 2 — Grid Behaviour

Universities 3 + 4

Learn how measured voltages and currents behave under normal and abnormal conditions, using the grid configuration as context.

Output: Electrical behaviour fingerprints

Model 3 — Complete Grid Behaviour

ALL FOUR UNIVERSITIES WORK TOGETHER

Connects topology changes with changes in electrical behaviour, learns how effects spread across the network and understands how the whole system responds.

Integrated Energy Foundation Model

Three things the AI learns — in simple words

One changing grid, one shared model, and three questions answered together.

1 WHAT CHANGED?

The software follows switch positions and updates which lines, feeders and sources are connected.

2 WHO WAS AFFECTED?

It learns which nearby and distant grid areas respond when those connections change.

3 IS IT NORMAL?

It compares the new voltage/current behaviour with what is expected in that arrangement.

The same component keeps its identity even when its electrical role and normal fingerprint change.

The diagram stays. The electrical paths change.

An existing single-line diagram (SLD) is our map; switching updates which paths are active.

ONE SLD

Assets and their physical connections stay in the same model.

LIVE SWITCH STATES

SCADA tells us which connections are open or closed.

MEASURED RESPONSE

Nodes send values and triggered detailed waveforms.

MATCH BY TIME

Every event is linked to the exact grid arrangement when it happened.

Phase details are stored behind the diagram where they are needed.

Five practical building blocks.

Complementary to protection, SCADA and PMU/WAMS — no autonomous protection or control.

01

FIELD EVIDENCE

1-second summaries + triggered waveforms
SCADA switching events
COMTRADE / PMU / SCADA

02

GRID CONTEXT

One SLD + phase details
Updated after switching
Switching + operational state

03

TRUSTED SHARING

Access tiers • provenance
Federated/local training

04

ENERGY FM

Three linked learning tasks
Shared AI foundation
Adaptation + predictions

05

OPERATOR LOOP

Compare with actual events
Operator feedback
Human decision support

CROSS-CUTTING: DATA GOVERNANCE • SECURITY • OPEN SCIENCE • IP / BACKGROUND PROTECTION

How will we know the idea works?

We will test the models on real switching and events they have not seen before.

Works on another grid?

Train on some utilities; test on a new one

How big difference does the switching context and data grids segmentation quality affects

Compare with and without the changing SLD

Do triggered waveforms help?

1-second values alone vs values + waveforms

Does learning the impact help?

Compare event labels with measured consequences

Can it see what happens next?

Can early signals indicate later effects?

Can utility data stay local?

Compare secure local and shared training

Ambitious targets to validate with the consortium

All figures shown here are draft targets, subject to confirmed data access and pilot feasibility.

≥4	Data owners
≥2	Countries
≥500	Synchronized nodes
≥60k	Event records
≥200	Network segments
≥5	Downstream AI tasks

Build it in stages, then prove it works.

Stagger rollout and model development so the project produces value before field deployment is complete.

M1–M12

FOUNDATIONS

Import SLDs, map nodes, gather switch data and agree tests

M7–M32

BUILD & LEARN

Deploy nodes, learn switching changes, impacts and behaviour

M18–M42

VALIDATE & SCALE

Test new grid configurations and utilities; improve and scale

What do we need from partners?

Clear commitments now will make the project much easier to deliver.

01	**Real network data**	SLDs, switching records, historical events and permission to use them
02	**AI development lead**	A named team to build and test the three learning parts
03	**Nodes and installation**	Confirmed locations, timing quality and realistic deployment costs
04	**Utilities and pilots**	Named engineers to check switching events and AI results
05	**Funding / leadership**	Coordinator, 70% IA cost treatment and compliant partner budgets

One shared location for the evolving proposal

Use the primary short Part B draft and the structured partner documents.

aifm.power-view.org

01	Short Draft Part B Proposal
02	Budget lines
03	Partner information required
04	List of participants
05	Short call summary
REF	EU Part B template + instructions

Choosing the strongest coordinator

One research partner has already agreed to coordinate. We can still compare other interested candidates before making a joint decision.

01 SECURED OPTION

Coordinator already available

A research partner has confirmed willingness to take this role. The proposal can move forward without waiting for further candidates.

02 OPEN TO ALTERNATIVES

Invite additional expressions of interest

Other capable partners may volunteer. Compare experience, administrative capacity, EU project management and ability to support the full consortium.

03 CONSORTIUM DECISION

Select the strongest fit

Agree one coordinator for the single GRIDTRACE-FM application. Choose on delivery strength, credibility, availability and consortium support.

More favourable coordinator budget

Propose an enhanced and justified allocation for coordination, reporting, administration, quality control and submission responsibilities — to be agreed in the budget.

Four consortium meetings. One submission.

Proposed meeting rhythm and decisions — working backward from the 1 December 2026 deadline.

15 OCT

KICK-OFF

Agree the idea, teams, roles and missing inputs.

30 OCT

MEETING 2

Lock research structure, datasets and WP responsibilities.

13 NOV

MEETING 3

Review complete Part B draft, budgets and pilot commitments.

25-27 NOV

MEETING 4

Approve final proposal, numbers and submission package.

01 DEC

DEADLINE

Submit through Funding & Tenders Portal.

Between meetings: partners edit their assigned Part B sections and upload documents to the shared workspace.

Note: 30 October is 15 days after the 15 October kick-off; the following two meetings are exactly two weeks apart.

What each meeting must decide

Each meeting ends with approved decisions and a short list of actions — not another open discussion.

Concept and ownership

15 OCT · KICK-OFF

Confirm Model 0 → Models 1 & 2 → integrated Model 3; appoint the four university roles and a lead integrator. Rename WPs and distribute ,

Decision: owners and data requests

Research and data locked

30 OCT · MEETING 2

Evaluate the starting point Agree data levels , utility partners, available public/utility datasets, missing switching states, pilot cases,

Decision: frozen technical outline

Proposal should have all parts

13 NOV · MEETING 3

Review full Part B, realistic pilots and KPIs, 42-month schedule, Milestones, partner person-months and budget; resolve eligibility gaps.

Decision: content + budget approval

Final sign-off

27 NOV · MEETING 4

Check partner details, data-access letters, ethics, risks, WP tables, budget consistency, page limits and upload readiness.

Decision: submission authorization

Backward plan: when inputs must be ready

Leave a buffer for consistency checks, the Funding & Tenders Portal and last-minute corrections.

16–23 OCT	**All partners**	Partner descriptions; contacts/PIC; preliminary budgets; data inventory; utility sites and permissions.
26–30 OCT	**Research leads + IOSDD**	Common data schema; Model 0 baseline; Models 1/2 split; Model 3 ; refined WPs and work plan.
02–06 NOV	**WP/task leaders**	First complete written inputs to Excellence, Impact and Implementation; data-use and pilot evidence.
09–13 NOV	**Coordinator + all partners**	Full integrated Part B draft; provisional total budget; validated objectives, KPIs and roles.
16–20 NOV	**Partners + coordinator**	Resolve review comments; final budget worksheets; commitment and access documents; quality review.
23–26 NOV	**Coordinator / admin lead**	Freeze Part B and annexes; portal entry; cross-check against Part A, budget and page limits.
27 NOV	**All partners**	Final consortium approval; no new scope changes unless critical.
28 NOV–01 DEC	**Submission team**	Final checks and early submission; allow time for unexpected portal/document problems.