Contribution to the Digital Omnibus

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**in Coordination with the founding members of the Initiative**

datenstärkenwind

# "When Existing Data Is Withheld, Europe Pays the Price"

A strong voice for a swift implementation of the unchanged[i] DATA ACT – as a steppingstone for Europe's energy sovereignty

**At 1,500 revolutions per minute, wind turbines don't complain before they break — but the data does.** Europe is currently debating how to “simplify” its digital rulebook under the Digital Omnibus while simultaneously launching a Data Union Strategy to strengthen competitiveness, AI leadership and (energy) sovereignty. This debate risks overlooking a simple operational truth from the field:

When industrial data is locked away, Europe loses megawatt-hours, money, resilience — and sometimes turbines.

The following real-life incident is not a theoretical model. It is a documented event from a German wind park. It demonstrates, in brutally physical terms, what is at stake when operational data is not effectively accessible to those who own and operate Europe’s critical energy infrastructure.

## ***This should have never happened***

***and will be avoided if data is being shared as per DATA ACT***

**07 April 2023, 14:51 – A windpark in Germany.**

The turbine stops.

The operator sees a generic message:
**“WS2 timeout error.”**

No detailed diagnosis. No actionable insight. No early warning that a critical mechanical component was in the process of failing.

Four days later, the OEM service team arrives — explicitly to inspect “vibration alerts.” Shortly afterwards, the verdict:

**“Die Kupplung hat es zerrissen.”**
(The coupling has been torn apart.)

The coupling between gearbox and generator — rotating at **1,000–1,800 rpm** in the high-speed section of the drivetrain — had disintegrated. The resulting damage inside the nacelle was comparable to an internal explosion.

Crucially, the **technical analysis** makes one thing clear:

The defect did not occur suddenly. It developed over time through creeping overload and misalignment of the drivetrain.

In other words:
The machine was speaking before it failed, but no one was listening.

High-speed vibration signals, torque irregularities, drivetrain misalignment trends — all of these are measurable phenomena. Modern wind turbines generate thousands of data points per minute, from weather data to machine vibration data. Electrical systems operate at control cycles of 100 Hz and power electronics at up to 5 kHz. High resolution vibration data of blades and drivetrain are gathered but not shared.

But without effective access to high-resolution and historical operational data — as intended by the Data Act — operators cannot systematically analyse, model, and intervene before catastrophic failure occurs (acting themselves or via specialist third parties).

This is not about convenience.

This is about whether Europe uses its installed renewable capacity intelligently — or lets it tear itself apart. Wind turbines are becoming significantly larger and more powerful. Onshore units now commonly exceed 6–7 MW, offshore turbines reach 12–15 MW (and >300m in height, higher than the Eiffel Tower). With larger rotor diameters and higher hub heights come higher mechanical loads, much higher rotational energy, and more risks and costs for the owners and operators of a downtime. OEMs and insurers are covering only a fraction of risks. The main risks are carried by the owners and operators who have no access to the relevant data (pre Data Act).

A misalignment or vibration issue in a 3 MW turbine is already serious. In a 12 MW offshore turbine, the stored rotational energy and component stresses are multiples higher. With larger turbines there is larger risk of failure and downtime costs. A documented offshore case described in the Annex 2 shows how a detectable transformer pressure anomaly escalated into a failure causing 75 days of downtime and more than €1.2 million in losses from one incident alone — damage that earlier analysis of operational data could likely have prevented.

# ORDER OF MAGNITUDE AVOIDABLE ENERGY LOSS

# FROM MAJOR COMPONENT DAMAGES

(GEARBOX, MAIN BEARINGS, GENERATOR, AZIMUTH/YAW)

## 1,500,000 MWh

**of avoidable annual electricity loss in Europe**

## €100 Mio.

**in lost value every year**

## ELECTRICITY FOR 1 MIO. PEOPLE

**that could be powered without building a single new turbine. Or in other words this equals the**

## ENERGY PRODUCED BY 200 TURBINES.

The figures do **not include any secondary costs**, material replacement costs, repair logistics costs, or grid impacts.

Annex 1 provides the derivation of these figures, - combining available reference data with transparent conservative assumptions. We cannot currently perform this analysis with precise figures because not all of the relevant data is accessible. It is an indicative order of magnitude. Once the Data Act is effectively implemented and respected, such analyses should become significantly easier and more precise.

**Data and Trade Secrets in the Wind Sector – Protection Without Dilution**

Some stakeholders argue that broader restrictions on operational data access are necessary to protect trade secrets of OEMs, including wind turbine manufacturers. In the wind sector, this claim does not withstand technical scrutiny.

Wind turbines indeed embody decades of engineering expertise, including proprietary control strategies, drivetrain configurations and inverter and blade designs. These elements deserve protection. However, the question for the Digital Omnibus is not whether trade secrets should be protected — they already are. The relevant question is whether **Articles 4(8) and 5(11) of the Data Act need to be expanded to protect them. Based on the technical realities of the sector, the answer is: no.**

The data required for predictive maintenance and AI optimisation consists of **operational usage data generated during operation**, including SCADA signals (e.g. temperature, pressure, and high-frequency vibration, torque and speed), controller data, high-frequency electrical measurements, error logs and **historical degradation trends**. This data reflects how the asset performs and ages in the field. It does not disclose source code, proprietary algorithms, design blueprints or other engineering know-how. A vibration trend does not reveal gearbox design, and an electrical waveform does not reveal inverter firmware logic.

At the same time, legitimate protection interests are already fully covered under existing EU law, including the **Trade Secrets Directive (EU) 2016/943**, contractual confidentiality obligations and established IP protection mechanisms. The Data Act itself already allows proportionate safeguards and refusal where serious and demonstrable economic harm can be shown. There is therefore no regulatory gap that requires expanding the trade secret exception.

Providing operational data also does not require exposing internal software or system architecture. Standard technical and organisational measures — such as role-based access control, structured APIs, data segmentation and secure data environments — allow operational telemetry to be shared while fully protecting firmware, source code and proprietary models.

**Historical Data Is Essential**

Predictive maintenance and reliability analysis depend on **longitudinal datasets**. Many failures in wind turbines develop gradually through creeping degradation and can only be detected by analysing **historical operational data over extended periods**.

If historical operational data is **available to the data holder and used for diagnostics, maintenance or service purposes**, it must fall within the scope of data access — **including data generated before 12 September 2025**. Without access to historical datasets, many predictive maintenance and AI applications become technically ineffective.

# OUR RECOMMENDATIONS FOR THE DIGITAL OMNIBUS

Europe is entering a radically different geopolitical phase. Energy security, industrial resilience and digital sovereignty are no longer abstract ambitions — they are strategic necessities. The Data Act is one of the few instruments that directly connects these objectives.

**The Digital Omnibus must therefore reinforce the original purpose of the DATA ACT — not dilute it.**

## Recommendation 1: No Change to Articles 4(8) and 5(11)

Our first and clearest recommendation is: Do not amend Articles 4(8) and 5(11).

The original Regulation already strikes a carefully calibrated balance. Expanding refusal grounds through geopolitical exposure clauses risks:

- Legal uncertainty,
- Strategic overuse of refusal,
- Reinforcement of structural lock-in,
- Slower deployment of AI and predictive maintenance,
- Reduced SME participation.

The Data Act was adopted to unlock industrial data for innovation and competition. Weakening Chapter II would undermine that objective precisely at the moment when Europe needs it most.

The balance must be reaffirmed — not reopened.

## Recommendation 2: Use the Data Act to Build a Competitive and Bankable European Services Market

Europe's wind turbines are long-lived infrastructure assets with operational lifetimes of 20–30 years. Their deployment depends on reliable maintenance, **long-term financing and insurability**. A functioning service- and aftermarket is therefore not a secondary issue — it is a structural condition for Europe's energy system.

Today, the maintenance market for wind turbines is often effectively closed for long periods. Long-term service contracts combined with restricted access to operational data can lock maintenance markets for 15–20 years. Without access to operational and historical usage data, independent European service providers cannot compete, operators cannot organise competitive tenders, and financiers and insurers cannot independently assess technical risk.

Effective implementation of the Data Act can open this market. If operational data is genuinely accessible in practice, operators will be able to use specialised service providers, independent analytics and predictive maintenance solutions. This would increase competition, improve transparency of asset health and reduce systemic risk in wind portfolios.

The European Commission should therefore explicitly treat Data Act implementation as a structural instrument for strengthening Europe's renewable energy infrastructure. This requires ensuring that operational and historical usage data is practically accessible to operators and authorised third parties, enabling competitive service markets and reliable technical risk assessment for financiers and insurers.

At the same time, EU innovation and industrial programmes should support the emergence of **European service, diagnostics and analytics providers** that can operate on this data basis.

**Recommendation 3: Structured EU-led or -initiated Sector Round Tables and Studies on the EU-wide value creation potentials by sector**

Finally, implementation must be proactive and managed. Many practical questions in industrial sectors are not ideological — they are technical:

- Which data categories are uncontested operational usage data?
- Which data categories may legitimately contain IP-sensitive elements?
- How can interfaces be standardised?

These conversations will not happen organically. Power asymmetries in many markets — particularly between OEMs and SME operators / startups — prevent voluntary convergence.

We therefore recommend that the European Commission initiate and host structured, sector-specific round tables to bring together OEMs, operators, service providers and technical experts to develop practical sector guidance. We also recommend conducting studies on the potential in each sector (to validate and expand on the numbers we have shared in our "order of magnitude calculation).

The objective should be rapid operationalisation — not prolonged litigation.

We are on standby to support the EU's and member states' efforts to turn the ideas of the DATA ACT into wealth creation for Europe. If regarded as useful, we are happy to share further details about operational issues and concrete use cases.

March 2026

## ANNEX 1 ORDER OF MAGNITUDE OF AVOIDABLE LOST ENERGY PRODUCTION

**One Operator – One Failure**

A severe coupling failure of this type typically results in:

- **6–12 months of downtime**
- heavy crane logistics
- expensive component replacement
- secondary damage inside the nacelle
- lost energy production

Assume conservatively:

- 3 MW average turbine
- 2,500 full-load hours
- 9 months downtime (average)

That equals roughly:

**≈ 5,600 MWh of lost electricity** for one single turbine. At €65/MWh, that is roughly **€365,000 lost revenue** from one incident.

This does **not include any secondary costs**, material replacement costs, repair logistics costs, or grid impacts.

What if this failure could have been detected earlier — when the vibration signals began to drift, reducing downtime from nine months to one month?

The avoided loss per turbine would be on the order of:**≈ 5,000 MWh saved.**

**Europe-Wide Impact of Avoidable Major Component Failures**

In Europe, approximately 291 GW installed capacity are in operation (Wind Europe Sep. 2025). It is planned to increase this number to 450GW by 2030.

Applying a historically observed rate from a representative 450-turbine portfolio to Europe as an indicative extrapolation (calculated on a 3-year average, 2023–2025) of one of the members of the Datenstärkenwind group, there are **0.13 failures per turbine per year** (downtime > 24h) of major components, with an average mean time to repair of **37 days** and an average avoidable lost energy production of **120 MWh per case**.

Counting only major component failures with downtimes > 24h: **Gearbox, Bearings, Generator, Azimuth/Yaw**.

**Conservative European assumptions:**

- 3 MW average turbine
- 2,500 full-load hours
- 37 days average downtime (= 1.2 months)
- 0.13 major failures per turbine per year

This equals approximately 12,700 major failures annually across Europe.

If each of these failures causes roughly **120 MWh** of avoidable loss, then the European impact is:

≈ 1,500,000 MWh per year

This is equivalent to a rated power of **600 MW** — without building a single new turbine.

At €65/MWh, this corresponds to:
**≈ €100 million in lost electricity value** per year.

And in system terms:

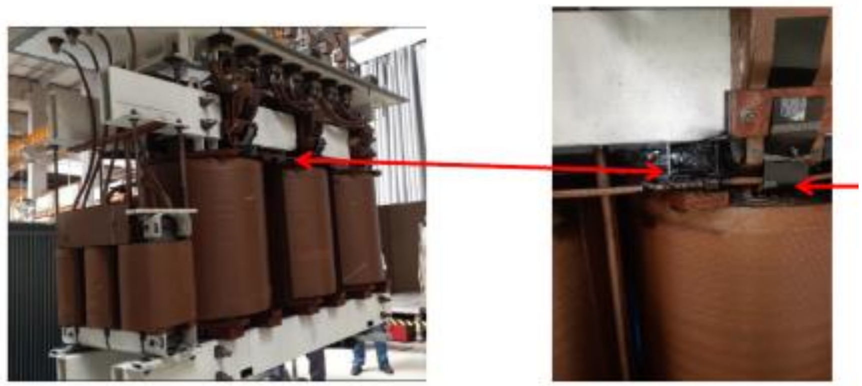
- Equivalent to the annual electricity consumption of ≈ **430,000 households** or a city of ≈ **1 Mio. People**
- Avoidable $CO_2$ emissions in the range of **600,000 tonnes** if replaced by fossil generation

## ANNEX 2 – Offshore wind: why data access matters even more at sea

Turbine tripped due to a transformer pressure fault in 2019.

The operators see alarms related to an overpressure and switchgear trip.

The transformer pressure caused a trip of the switchgear. Damage occurred to the magnetic core, coil and busbar of the transformer. A tank deformed and leakage started from overpressure in the tank due to a short circuit.



With close monitoring of data for temperatures and pressure the damage event could probably been avoided.

<u>A transformer failure results in</u>

60-90 days outage

-> Special vessel for lifting
-> Expensive component replacement
-> Secondary damage inside the tower
-> Lost energy production

<u>Assume conservatively:</u>

- 8 MW average turbine
- 4000 full load hours
- 75 days downtime
- Equals roughly: 6575 MWh

At 65 EUR/MWh

=427.000 EUR lost revenues

Repair and replacement costs: around 800.000 EUR costs

<u>What if the anomaly has been detected earlier and repaired:</u>

**Downtime: 5 days instead of 75 days**

**Repair Costs & Revenue Loss: 30.000 EUR instead of 800.000 EUR**

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A transformer pressure fault in an offshore wind turbine is not just another technical incident. Offshore wind farms are often located tens of kilometres from shore, and major repairs are therefore far more complex than on land. Access depends on marine logistics, safe weather windows and the availability of specialist vessels for heavy lifting and component exchange. In practice, even a technically straightforward intervention can be delayed because offshore mobilisation is expensive, vessel capacity is limited and bad weather can postpone inspections and replacement work for days or weeks. Offshore downtime is therefore not only a technical issue, but a logistics, cost and resilience issue at European level.

The documented offshore case illustrates this clearly. The turbine tripped due to a transformer pressure fault. The event damaged the magnetic core, coil and busbar, deformed the tank and led to leakage after an internal short circuit. The case documentation explicitly states that closer monitoring of temperature and pressure data could probably have avoided the damage event. It also shows why offshore failures are especially costly: a transformer failure can mean 60–90 days of outage, specialist lifting vessels, expensive component replacement, secondary damage inside the tower and substantial lost energy production.

For this offshore case, a conservative representative turbine size of 8 MW is appropriate. While newly installed offshore turbines in Europe averaged 10.7 MW in 2025, that figure reflects recent installations rather than the full installed fleet. At the same time, 4,000 full-load hours remain a cautious central assumption for offshore wind. On that basis, 75 days of downtime correspond to roughly 6,575 MWh of lost electricity generation for one turbine. At €65/MWh, this equals around €427,000 in lost revenue. Adding around €800,000 in repair and replacement cost brings the direct gross cost of one such offshore failure to roughly €1.23 million

The **European relevance** is clear. Europe had around 39 GW of offshore wind capacity installed by the end of 2025. In spring 2025 there were 15,100 offshore wind turbines in operation worldwide, of which 26% were in the EU and 19% in the UK. This implies a European core market of roughly 6,800 offshore turbines in the EU and UK combined. If this one transformer failure pattern occurs in only 1 out of 500 offshore turbines per year, this already translates into about 13.6 comparable major incidents annually across the European core market. The **resulting impact would be around 89 GWh of lost offshore generation**, about **€5.8 million in lost electricity revenues** and roughly **€10.9 million in repair and replacement costs every year** — or around €16.7 million in direct annual cost for this one failure type alone.

In offshore wind, restricted data access is therefore not merely an operational inconvenience. It increases outage duration, magnifies vessel and logistics costs, weakens competition in the service market and raises the **cost of maintaining critical European energy infrastructure**. Effective implementation of the Data Act is therefore directly relevant to **Europe's energy resilience**, industrial competitiveness and energy sovereignty.

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[i] Art 4 and 5 DATA ACT