In the business of positive energy

Extension of wind turbine lifespan in Europe: an evolving regulatory framework

Wind farms installed in Europe during the 2000s are now, in many cases, reaching their **20th year of operation**. This marks both a symbolic and technical milestone: beyond this point, turbines typically exit their manufacturer warranty period and their initial economic model (such as subsidies or feed-in tariffs). Faced with this, operators must choose between two main options: decommissioning/repowering or **lifetime extension**.

While extending a turbine's operational life can be economically attractive, this process is **strictly regulated** - both to ensure the safety of the installation and its **regulatory compliance**. Although approaches differ across European countries, some common principles apply: technical assessment, regulatory justification, and insurance validation.

In France, continued operation beyond 20 years is allowed, but tightly regulated. Three main regulatory references must be understood:

- The **Environmental Code**, which may require an **amendment to the ICPE permit**.
- **The ministerial decree of June 22, 2020**, which mandates **specific end-of-life checks**.
- **IEC standard 61400-28,** used to evaluate the **residual lifespan**.

Operators must provide robust technical evidence (such as fatigue analyses and structural inspections) and ensure compliance with both authorities and insurers.

DE Germany: Technical rigor and exit from subsidy scheme

In Germany, although there is no strict legal lifetime limit, wind turbines typically exit the EEG support scheme after 20 years. To continue operating, operators must provide a **technical viability report**, known as the Nachweis der Weiterbetriebsfähigkeit, prepared in accordance with the **BWE/FGW TR 10** guideline.

This assessment includes:

- A fatigue analysis
- Inspections of key components
- A site evaluation (wind conditions, historical loads, etc.)

The report must be validated by independent bodies such as TÜV.

ES Spain: Regional oversight and independent inspections

Spain does not set a maximum operational lifespan for wind turbines, but it requires **technical inspections starting at 20 years of operation**. These inspections are based on the **IEC 61400-28** standard and may be mandated by regional authorities, sometimes requiring an **external audit**.

Operators must demonstrate the safety and integrity of the installation in order to maintain their grid connection or power purchase agreements.

IT Italy: A supervised self-certification approach

In Italy, there is no legally mandated maximum service life for wind turbines. However, **technical self-certification** is required to demonstrate that the turbine can continue operating safely. This process is based on the **CEI EN 61400 standard** (the Italian equivalent of IEC 61400).

Inspections are expected at the 20-year mark, and authorities may request risk assessments or recommend **repowering**, depending on the regional context.

DK Denmark: A model framework

Denmark applies a highly regulated approach, overseen by the Danish Energy Agency.

Any extension of operation involves:

- **A structured technical assessment**.
- The use of the **DS/EN 61400-28 standard**.
- An analysis of the turbine's historical performance, corrosion, foundations, and mechanical systems.

This rigorous approach ensures the trust of insurers and local authorities in the safety of aging installations.

NL Netherlands: Regulated flexibility

In the Netherlands, regulations are set at the local level, but a **technical assessment** is mandatory. The report must demonstrate the **residual service lifespan** and may lead to a **permit modification request**.

Compliance with the **IEC 61400-28** standard is widely recognized, although local adaptations may apply.

SE Sweden: Recommendations rather than regulations

In Sweden, there is no specific regulation governing the extension of wind turbine lifespans. However, operators are strongly encouraged to:

- Conduct **risk analyses**.
- Refer to international standards.
- Submit technical reports to insurers to ensure continued coverage.

This flexibility operates within a framework that holds the **operator responsible**.

Extending the operational life of wind turbines is now an essential strategic option for operators. While it allows optimisation of initial investments, it cannot be done without a rigorous approach combining:

- **Technical expertise** (fatigue, structure, components).
- **Regulatory compliance** (local, national, international standards).
- **Insurance validation**.

Each European country brings its own specifics, but all converge towards a common goal: **ensuring the safety**, **performance**, and **durability** of turbines at the end of their service life.