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1. Problem statement

European industries are submitted to a growing number of regulations.

Restrictions are put on CO₂ emissions but also on energy consumption, to limit their impact on climate change and become more energy efficient and competitive.

For energy-intensive companies it is important to cope with **new obligations** and have access to tools that can help them comply with the requirements, esp wrt the **EU2030 policy** and its fixed target for increasing energy efficiency by **30%**, next to reducing GHG by **40%** and increasing renewable energy to min **27%**.

2. The Energy Efficiency Directive^[1]

Released in December 2012 / transposed in June 2014

The EED was created to reach the 20% EU target for reduction of energy consumption (20-20-20 target [2]). It introduces legally binding measures covering the whole energy chain.

Measures for industry:

- Mandatory energy audit before **Dec. 2015**
- Energy consumption reduction target (defined at national level)

Audit exemption possible: if company is certified via an approved energy management system (ex: **ISO 50001**).

→ In both cases it means that companies have to:

- conduct** regular energy reviews,
- determine** their performance
- identify, evaluate, implement** energy savings options
- monitor** the impact on energy efficiency

3. Energy policies across Europe

National energy policies organized in 3 main groups^[3]

Prescriptive policies, eg:

- Mandatory or voluntary agreement between government and industry
- Most commonly used
- Commitment from both sides
- Often involve ISO 50001 certification

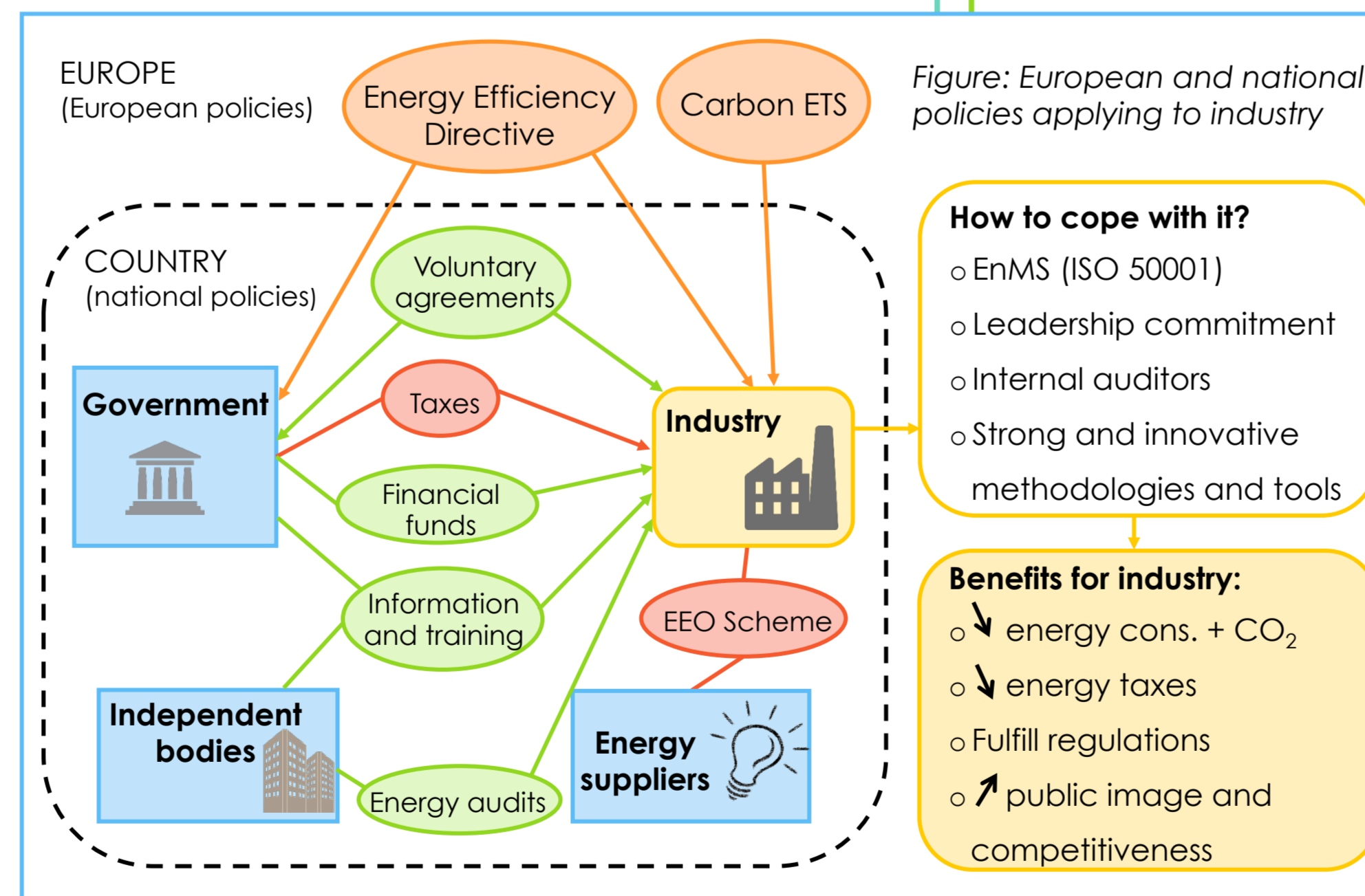
Economic policies, eg:

- Taxes (energy)
- Financial incentives (dedicated funds, tax reduction/exemption)

Supportive policies, eg:

- Information campaigns
- Energy audit training
- Best practice information sharing

→ Overall: **energy management system** is the **key driver** for continuous energy performance improvement



→ A balanced policy mix seems to be the most efficient to drive changes

4. Energy management (ISO 50001)

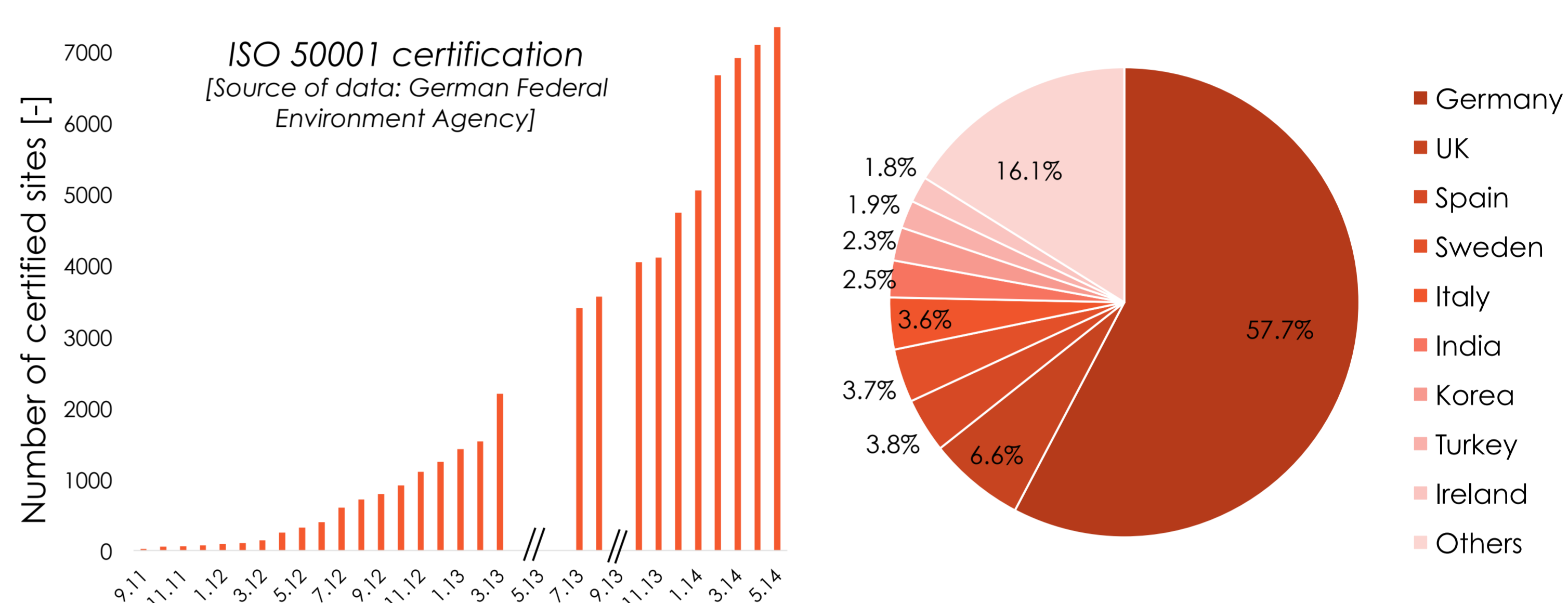
ISO 50001 is the worldwide reference for an effective energy management system (EnMS). It is based on a **continuous improvement** principle, and builds on ISO 9001 and ISO 14001.

The core of the technical part is called the **energy review**:

- Determine the energy profile of the site
- Evaluate its performance
- Generate an energy baseline
- Identify, evaluate, implement improvement options

→ similar requirements as in **energy audits**

Certifications are increasing worldwide with **Germany as leader**.



Strong importance for companies to develop powerful EnMS but also **tools and models** to have a good understanding and control of the energy consumption.

5. Available tools

How to carry out an energy review?

Different **tools/methods** depending on the level of detail:

- Energy and mass balances } First stage, global picture
- Trend analysis }
- Key Performance Indicators } Second stage, benchmarking
- Best Practice Technology (BPT) }
- Regression analysis (single/multi variables) } Deeper analysis
- Process integration, optimisation }

Techno-economic energy **models**^[4], gathering methods previously mentioned, are promising tools for energy management, identifying **trade-off** between investment and energy performance.

Limitations, eg:

- Confidentiality issues
- Lack of proper guidelines to conduct the review
- Need for appropriate KPI's and benchmarks [5]
- Need for the integration of real time data [5]

On top of these challenges, barriers coming from the **energy efficiency gap issue** have to be overcome involving high commitment from management

Conclusion: Innovative approaches and efficient tools for energy management will likely play a key role in the next decades, in order to reach the ambitious targets for 2030 and beyond.