Co-funded by
the European Union

Toolkit Zone 3
Practical Modules

Energy & Carbon Management

Green and Circular Economy in Business by Digital Solutions

2024-1-EL01-KA210-ADU-000251741

Co-funded by the European Union. The contents of this publication are the sole responsibility of the authors and do not necessarily reflect the opinion of the European Union.

credit

SISERA Greece

AKDENİZ PANORAMA DERNEĞİ

Officine Europa

Chapter 11 - Energy & Carbon Management

Recent survey results show that 93% of EU SMEs have already adopted at least one resource-efficiency measure, such as saving energy or minimising waste, and around one quarter have set a strategy to cut their carbon footprint (European Commission, 2024). This indicates that energy and carbon management are no longer niche concerns but a mainstream part of SME practice.

11.1 Energy audits: identifying opportunities for efficiency

One of the first practical steps an SME can take on this journey is to conduct an energy audit. An energy audit is described in EU guidance as a systematic procedure for obtaining an accurate picture of a business's energy use, identifying cost-effective opportunities to save energy, and reporting the findings (Energy & Water Agency, 2025). In essence, the audit process involves examining where and how energy is consumed, from lighting and heating to machinery and processes, and pinpointing inefficiencies or losses. An audit may reveal outdated equipment, heat leaks in a building, or simply practices that waste electricity. By following a structured approach that typically includes data collection on energy bills, site inspections and analysis of systems, SMEs can prioritise which energy-saving measures will yield the greatest benefits.

Many countries and regions offer support to SMEs for such audits. EU policy explicitly encourages Member States to develop programmes that help SMEs undergo energy audits and implement the recommendations (European Commission, 2018). This recognises that, while energy audits are mandatory for large enterprises, they are equally valuable for smaller firms if made accessible.

The benefits of energy audits for SMEs are well documented. First are the financial gains. By identifying efficiency improvements, audits help companies cut unnecessary energy use, directly lowering utility bills and improving profit margins (Energy & Water Agency, 2025). Implementing no- or low-cost measures, such as optimising heating settings or fixing compressed-air leaks, can often produce immediate savings. Over time, these savings can far exceed the upfront cost of the audit and any equipment upgrades.

There are also significant operational benefits. Energy audits often uncover ways to improve the working environment and productivity. Better insulation and ventilation can enhance employee comfort and equipment performance. Streamlining energy use can make operations more reliable, with fewer outages or maintenance issues, and can improve safety as inefficient systems are brought up to standard (Energy & Water Agency, 2025). The environmental benefits are equally clear. By acting on audit findings, SMEs reduce their greenhouse-gas emissions and environmental footprint, contributing

to climate goals and often improving their standing with environmentally conscious clients and partners (Energy & Water Agency, 2025).

In practical terms, an energy audit provides a roadmap for SMEs to cut energy waste and costs. Managers can hire certified energy auditors or use public programmes that offer free or subsidised audits for small businesses. The process typically involves a walkthrough of facilities, analysis of energy data and a report with recommended measures ranked by cost-effectiveness. Acting on these recommendations, whether upgrading to efficient lighting, servicing heating and cooling systems or optimising production processes, allows SMEs to achieve quick wins in both energy savings and carbon reduction. Establishing a habit of periodic audits, for example every few years, helps maintain continuous improvement. As one European guide puts it, undertaking an energy audit reduces energy use, lowers bills and supports the reduction of the company's carbon footprint while revealing new opportunities to conserve energy (Energy & Water Agency, 2025). For a small business aiming to combine sustainability with profitability, energy audits are an essential starting point.

11.2 Integrating renewable energy in SME operations

Alongside improving efficiency, integrating renewable energy sources is a powerful way for SMEs to reduce carbon emissions and stabilise energy costs. The 2024 Eurobarometer survey reports that 12% of European SMEs already generate renewable energy on site, for example via solar panels on their premises, and about 23% purchase their electricity from renewable suppliers (European Commission, 2024). This trend reflects both falling costs of renewable technologies and growing awareness of their long-term benefits. By producing clean energy or sourcing green power, businesses can significantly lower their Scope 2 carbon emissions, those associated with purchased electricity, and in many cases their energy bills.

Solar photovoltaic panels on a roof can provide low-cost electricity after the initial investment, with surplus power in some systems sold back to the grid or stored for later use. Small biomass boilers or solar water heaters can replace or supplement fossil-fuel heating, reducing fuel expenses. The business case for such investments is increasingly positive. Empirical work finds that renewable energy is viewed by firms as a viable alternative to traditional sources and a strategic investment for long-term sustainability and cost savings (Drosos et al., 2021). Managers recognise that renewables reduce emissions and dependence on volatile fossil-fuel markets while paying for themselves through energy cost avoidance and improved energy security.

SMEs have several practical avenues to integrate renewables. On-site generation is a prominent option; solar panels are particularly common because they are modular and suitable for rooftops or small land areas. Many small businesses, from factories to farms, have installed solar systems, often supported by incentives or favourable financing. Others have adopted biomass heating or, where conditions allow, small wind turbines. Another approach is participation in energy communities or cooperatives, where multiple SMEs and households jointly invest in local renewable projects and share the clean power generated.

When on-site production is not feasible, SMEs can pursue green procurement of energy by choosing utility providers that offer 100% renewable electricity. This allows even office-based or urban SMEs to claim a largely carbon-neutral electricity supply. Green procurement can extend beyond energy to other inputs as well, for example sourcing raw materials or products from suppliers that rely on renewable energy, indirectly supporting decarbonisation in the supply chain.

Incorporating renewables often yields reputational and competitive advantages. SMEs can present themselves as clean energy users, appealing to environmentally conscious customers and business partners. Guidance for small businesses emphasises that visible climate action can strengthen brand loyalty and open up new market opportunities (EcoHedge, 2024). Early adoption of renewables can also protect businesses against tightening carbon regulations or rising energy and carbon prices (EcoHedge, 2024). A small manufacturing firm that invests in a solar array today will cut its current electricity costs and buffer itself from future changes in grid energy prices or climate-related charges.

Case material from European SME networks illustrates these benefits. For example, one local supermarket combined the installation of rooftop solar panels with energy-efficient refrigeration and lighting, achieving immediate financial returns while significantly reducing emissions (SMEunited, 2024). A bakery that installed solar PV, heat pumps and heat-recovery systems reported major cuts in both energy use and CO_2 emissions, demonstrating that even small enterprises can successfully implement ambitious low-carbon energy strategies (SMEunited, 2024). These examples show that renewable integration is technically and economically feasible for SMEs when it is planned in connection with broader energy-efficiency measures.

11.3 GHG accounting basics for SMEs (Scopes 1, 2 and 3)

To manage carbon emissions effectively, SMEs need a basic understanding of their greenhouse-gas footprint. Greenhouse-gas accounting may sound complex, but its core

structure is straightforward and increasingly accessible to smaller firms. The widely used Greenhouse Gas Protocol provides a standardised framework that divides emissions into three “scopes” (World Resources Institute & World Business Council for Sustainable Development, 2004).

Scope 1 covers direct emissions from sources that an organisation owns or controls. For a typical SME this includes emissions from on-site fuel combustion, such as gas boilers, process heat or diesel generators, as well as fuel used in company vehicles. Scope 2 accounts for indirect emissions from purchased energy, primarily electricity and also district heating, cooling or steam. Although the SME does not emit these gases at its own facility, the power plant that generates the energy does, so these emissions are associated with the company’s energy demand. Scope 3 encompasses all other indirect emissions along the value chain of the company’s activities. This broad category can include emissions from producing purchased materials, business travel, employee commuting, waste disposal, distribution and transport, and in many cases the use and end-of-life of products. For many businesses, Scope 3 represents the largest share of total emissions (World Resources Institute & World Business Council for Sustainable Development, 2015).

For SMEs beginning to assess their carbon impact, a pragmatic approach is to start with the sources that are easiest to measure and most under the company’s control. Typically this means focusing first on Scope 1 and Scope 2 emissions (EcoHedge, 2023). Tracking fuel use, for example litres of diesel or cubic metres of natural gas, and electricity consumption from utility bills provides a straightforward basis to calculate these emissions using standard emission factors. Many national agencies, energy suppliers and international initiatives provide free tools to convert energy data into tonnes of CO_2 equivalent. By establishing a baseline inventory of Scope 1 and 2 emissions for a given year, an SME can identify its carbon “hotspots”, such as an inefficient boiler or energy-intensive process, and set targets for reduction.

Over time, as capability grows, the company can extend its accounting to relevant Scope 3 categories. This is becoming important as larger companies, which are often the key clients of SMEs, increasingly ask for information on the carbon footprint of their suppliers. Understanding key Scope 3 categories helps an SME respond to such requests and identify further opportunities, for instance by choosing low-carbon suppliers, optimising logistics or working with customers on lower-impact product use.

GHG accounting should follow a few core principles: relevance, completeness, consistency, transparency and accuracy (World Resources Institute & World Business Council for Sustainable Development, 2015). In practice, this means including all

significant emission sources in the inventory, using consistent methods from year to year so that progress can be tracked, and being open about any exclusions or estimates. Even if an SME's emissions are relatively modest, a rigorous approach demonstrates credibility and commitment, which is increasingly valued by partners and investors. The process often reveals inefficiencies that the company can address. A basic inventory might show that a disproportionate share of emissions comes from electricity, strengthening the case for efficiency or renewable investments, or it might highlight that company vehicles are a major source, prompting a shift to more efficient vehicles or better route planning.

By quantifying emissions, SMEs can monitor their progress over time, for example by aiming to cut emissions by 5 or 10 per cent per year through targeted measures, and adjust strategies if the data show they are off track. Many SMEs now publicly report their carbon footprints or set net-zero targets in initiatives such as the SME Climate Hub, using the GHG Protocol as a reference framework. While comprehensive sustainability reporting may still be beyond the immediate scope of many small firms, basic GHG accounting is increasingly part of modern business practice. It allows an SME to communicate its climate efforts credibly and to align with emerging regulatory and market expectations for transparency. Studies suggest that companies, including smaller ones, that actively reduce their carbon emissions tend to see improved financial performance over time, likely due to efficiency gains and better risk management (Ibishova et al., 2024). Carbon accounting is therefore not just an administrative exercise but a strategic management tool that helps identify where cutting emissions and cutting costs coincide.

11.4 Managing energy and carbon in practice

For SME managers, a central challenge is deciding which sustainability actions to pursue first and ensuring that these efforts support, rather than disrupt, business performance. A sensible approach is to prioritise carbon-reduction initiatives that also offer clear economic returns, the "low-hanging fruit". Energy-efficiency improvements identified in audits, such as improving insulation, optimising production processes or upgrading inefficient equipment, often have short payback periods and immediately reduce operating costs. Calculating simple metrics like return on investment or payback time for each project helps managers rank actions by their impact and feasibility. It usually makes sense to implement no- and low-cost measures straight away, then plan capital investments, such as new machinery or on-site renewable energy, that deliver larger emissions cuts and cost savings over the medium term. Considering synergies between actions is also important; for instance, improving efficiency can reduce the required size

and cost of a future solar installation. When carbon reduction is treated as part of business optimisation, rather than a separate agenda, it becomes easier to embed in the company's overall strategy.

Once actions are under way, monitoring progress is vital. SMEs should establish a small set of key performance indicators that track both environmental and business outcomes. Typical sustainability indicators include total energy consumption, energy cost savings, greenhouse-gas emissions (total or per unit of product) and waste generation. Many firms find it useful to relate some metrics to business activity, for example energy per unit of output or emissions per unit of revenue, so that improvements are not confused with changes in business volume. Regular monitoring, whether monthly, quarterly or annually, allows the firm to see trends and verify that initiatives are delivering expected results. If an equipment upgrade was supposed to cut electricity use by 10 per cent but data show little change, managers can investigate and adjust. Monitoring also helps in setting realistic future targets and keeping the team accountable. Some SMEs assign a specific person or small team to oversee sustainability indicators and integrate them into routine management reviews. Digital tools such as smart meters, basic energy-management software or simple spreadsheets can all support this process. The key is making performance visible and understandable across the organisation.

Aligning carbon-reduction goals with core business objectives is essential. One practical way is to link sustainability indicators with financial indicators, for example tracking how energy savings improve profit margins or how waste reduction lowers disposal costs. This helps employees see carbon management as part of improving efficiency and resilience, not just as an ethical obligation. Companies that lead in this area often embed sustainability directly into their mission and values, making clear that resource efficiency and environmental responsibility are integral to their identity. Evidence suggests that firms that actively manage environmental performance tend to be more innovative and better at long-term planning, which can strengthen competitiveness (Castillo-Vergara et al., 2023).

For SMEs, climate action is increasingly associated with market opportunities. A recent global survey by the SME Climate Hub found that among small businesses taking climate measures, most did so to enhance brand reputation, differentiate from competitors and meet customer demand (SME Climate Hub, 2025). Many large corporations now prefer suppliers with strong low-carbon credentials, and consumers often favour brands that can demonstrate credible climate action. By anticipating these trends, SMEs can position themselves as preferred partners in value chains and appeal to a growing base of environmentally conscious customers. Aligning with carbon-reduction goals can also

improve access to finance, as banks and investors are beginning to assess small businesses on environmental criteria and to offer better terms for green investments.

Finally, managers need to foster a culture of continuous improvement and engagement around sustainability. This involves communicating goals and progress to employees and encouraging staff at all levels to suggest improvements, since they often notice energy waste or inefficiencies in day-to-day operations. Celebrating milestones, such as achieving a significant emissions reduction or reaching a renewable-energy target, reinforces the importance of these efforts and supports motivation. Over time, what starts as a sustainability initiative becomes simply "the way we do things here". Environmental metrics sit alongside revenue, quality and customer satisfaction as part of the organisation's definition of success. Research following thousands of companies indicates that those which intensify carbon-reduction efforts see significant improvements in financial indicators such as return on assets and equity, particularly in more carbon-intensive sectors (Ibishova et al., 2024). Even on a smaller scale, the lesson is clear for SMEs: proactive energy and carbon management can drive efficiency, innovation and competitiveness and help ensure the business thrives in a low-carbon economy.

References

Castillo-Vergara, M., Carrasco-Carvajal, O., & Duréndez, A. (2023). Impact of environmental sustainability on open innovation in SMEs: An empirical study considering the moderating effect of gender. *Heliyon, 9*, e20096.

EcoHedge. (2023). *GHG Protocol guidance simplified for SMEs*.

EcoHedge. (2024). *Carbon footprint and the role of SMEs in decarbonisation*.

Energy & Water Agency. (2025). *Energy audits: Practical guide for more energy efficient business* (LEAP4SME project booklet).

European Commission. (2018). *Energy Efficiency Directive* (Article 8 – Energy audits and energy management systems).

European Commission. (2024, October 18). *Eurobarometer survey shows that more than 90% of SMEs invest in resource efficiency*. Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs.

Drosos, D., Skordoulis, M., & Kyriazis, N. A. (2021). The role of environmental awareness, renewable energy, and green innovation in shaping climate change perceptions. *Scientific Reports, 11*, 24102.

Ibishova, B., Misund, B., & Tveterås, R. (2024). Driving green: Financial benefits of carbon emission reduction in companies. *International Review of Financial Analysis, 96*, 103757.

SME Climate Hub. (2025). *New data reveals two-thirds of surveyed small businesses concerned over navigating climate action*.

SMEunited. (2024). *Best practices for SMEs in the energy transition* (Covenant of Companies for Climate & Energy report).

UK Department for Environment, Food & Rural Affairs. (2006). *Environmental Key Performance Indicators: Reporting guidelines for UK business*.

World Resources Institute, & World Business Council for Sustainable Development. (2004). *The Greenhouse Gas Protocol: A corporate accounting and reporting standard* (Rev. ed.).

World Resources Institute, & World Business Council for Sustainable Development. (2015). *GHG Protocol scope 3 standard: Corporate value chain accounting and reporting standard*.

Co-funded by
the European Union

Co-funded by the European Union. The contents of this publication are the sole responsibility of the authors and do not necessarily reflect the opinion of the European Union.

credit

SISERA Greece

AKDENİZ PANORAMA DERNEĞİ

Officine Europa