



Identification of green economy opportunities and barriers in Heves County: Situation assessment and review of EU experiences

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Introduction

This report provides background analysis undertaken to support an assessment of the potential and opportunities for green economic diversification and adaptation in Heves County, and associated employment creation and skills requirements. The report is organised as follows:

Chapter 2: Green economy definition and delineation establishes a working definition and scope of local green economic diversification and adaptation (e.g., greening of economic activities through the adoption of green production process and practices), as it pertains to Heves County, including circular economy, energy efficiency, renewable energy, energy storage, water efficiency etc.

Chapter 3: Good practices and common opportunities and barriers for green economic diversification and adaptation highlights some examples of good practice, and common opportunities (and barriers) for green economic diversification and adaptation. It uses examples from regions or localities across Europe but, also, from previous experiences of Hungarian regions that have undergone coal transition and industrial restructuring.

Chapter 4: Summary of the economy of Heves County provides a summary of the economic situation and performance of Heves County. It also considers its assets and opportunities relevant for green diversification and green adaptation of economic activities, together with relevant challenges or bottlenecks to green economy development.

Chapter 5: Identification and prioritisation of economic sectors for START consultation and engagement draws on findings from the preceding analysis to develop a categorisation of economic sectors in Heves County. This allows a structured assessment of opportunities and readiness for green economic diversification and adaptation, with particular emphasis on small and medium-sized enterprises (SME).

Annex 1: Identification of target SMEs for engagement on green and circular development provides information on the SME base in Heves County. This will be used to shape a survey led by BDSZ of enterprises' preparedness and ambitions for green and circular economy development and diversification, taking into account carbon intensity, linkage to green/circular economy activities, and sector weight in the local economy.

Green economy definition and delineation

Context

This section proposes a working definition of green economy as it pertains to Heves County and its transition away from lignite mining and power generation. The definition is intended to be applicable in the context of the START program of support, undertaken in collaboration with BDSZ, that *inter alia* will explore potential green economy opportunities in Heves County, with particular attention to employment opportunities to MPP workers and those in the associated supply chain.

The working definition is informed by the principles and concepts of the green economy noted below. The practical application of the working definition (for the purposes of the START program of support), in so far as identifying green sectors and activities, will be cognisant of existing green taxonomies and especially the EU Taxonomy for sustainable activities.

Proposed green economy working definition

The proposed green economy definition is as follows:

The green economy is an approach to business diversification and adaptation (in Heves County) that creates a virtuous relationship between *economic prosperity*, *environmental improvement*, and *social wellbeing*, thereby delivering benefits and mitigating adverse consequences associated with energy transition.

Economic prosperity is enabled through business diversification and adaptation that is founded on enterprise, innovation, investment, and skills, and that creates quality sustainable regional jobs. Accompanying changes in business consumption and production practices should contribute to regional *environmental improvement* and attainment of Hungary's NECP. Simultaneously, *social wellbeing* is advanced through the associated creation of job opportunities that are accessible to workers affected by lignite phase-out.

Understanding of green economic diversification

Traditionally, economic diversification has been understood as a strategy to transform the economy from using a single or narrow source of income to multiple sources derived from a greater range of sectors and markets, thereby improving economic performance. In the context of climate change adaptation, it takes on a new relevance as a strategy to diversify away from vulnerable products, markets, and jobs toward income sources that are low-emission and more climate resilient. In this context, one can speak of "green economic diversification" as a process of expanding and transitioning a local economy by promoting and investing in green sectors and industries.

In the case of coal regions, green economic diversification involves reducing reliance on traditional, resource-intensive and fossil fuels industries and the uptake of new economic opportunities in sectors where sustainability and environmental considerations are at the forefront. For example, this could be through the adoption of circular and sustainable resource management which also deliver on the creation of high-quality jobs and social inclusiveness. Often cited examples of green sectors and industries into which an economy can expand include renewable energy, energy efficiency, sustainable agriculture, waste management and recycling (and other circular economy solutions), green buildings and construction, green mobility, and eco-tourism.

By integrating green economy principles such as circular and sustainable resource management, creation of high-quality jobs and social inclusiveness into their economic diversification strategies, regions can achieve sustainable, inclusive, and resilient economic development through diversifying away from fossil

fuel-based products, markets, and jobs toward sectors and income sources that are low-emission and climate resilient.

When considered at the local level, the approach of green economic diversification recognises the unique characteristics, resources, and opportunities of a specific locality or region. It focuses on leveraging local strengths, such as natural resources, human capital/skills, cultural heritage, and existing assets, to foster the development of green industries.

Understanding of green adaptation

Green adaptation of economic activities refers to the process of modifying and adjusting economic activities to mitigate and adapt to the impacts of climate change. It involves incorporating climate change considerations and sustainable practices into various sectors and industries to enhance resilience, reduce vulnerabilities, and minimise negative environmental impacts.

Background: summary of green economy definitions and concepts

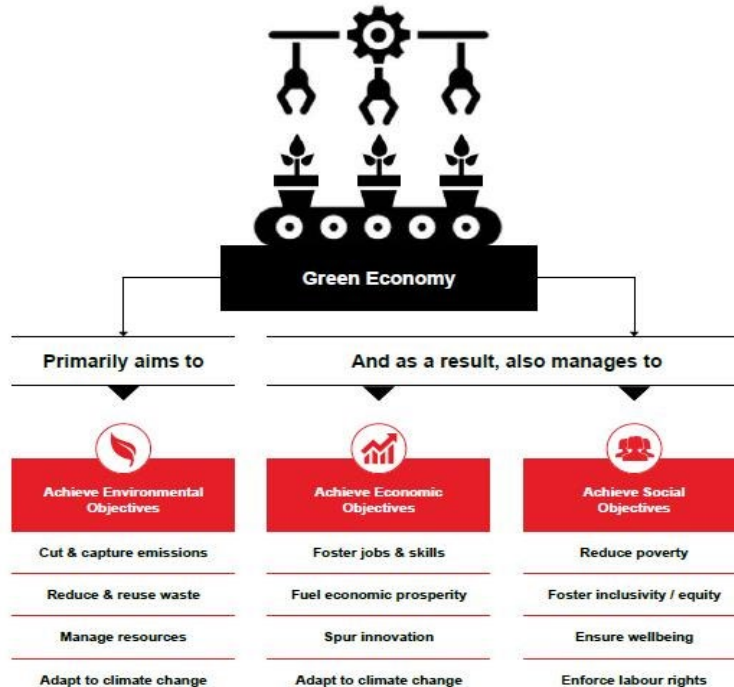
The term "green economy" is variously used to describe a mix of existing and emerging sectors, topics, principles, and concepts relating to the reshaping of the means of production and consumption towards structures and systems that are more sustainable from environmental, economic and social standpoints.

Perhaps the most widely used and authoritative green economy definition comes from UNEP, which defines the green economy as "*one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities.*"¹

1. UNEP (2011), Green Economy Report

Figure 1: A comprehensive definition of the green economy

A comprehensive definition of the green economy



Source: Oxford Economics and ARUP (2023)

In its simplest expression, a green economy can be considered as one that is low in carbon, resource efficient and socially inclusive.² Similarly, a recently published report by Oxford Economics and ARUP (2023) proposes the following definition: “*The green economy is an economic model which creates a virtuous relationship between economic prosperity and environmental and social wellbeing. This leads to growth that is decoupled from environmental externalities, or actually positively connected to the environment.*”³

Green economy objectives

The above-mentioned examples can be situated somewhere in the middle ground of green economy definitions that span a range from theoretically based derivations, often associated with fundamental macro-level revisions of existing economic models, to more practical taxonomies for describing and identifying the kinds of activities, products and services that fulfil “green” environmental, economic, and social objectives. From this perspective, a comprehensive description of the green economy should encompass three sets of objectives:

- **Environmental objectives**, which are typically associated with climate change mitigation (e.g., reduction of GHG emissions) and adaptation, but that may also cover circular and sustainable resource management outcomes.
- **Economic objectives** such as fostering economic prosperity, creating high quality jobs, improving standards of living, fuelling innovation and employment, and strengthening global trade competitiveness.
- **Social objectives** such as poverty reduction and social inclusiveness and cohesion.

Given the idea of a green economy remains driven by the global environmental crisis, environmental objectives have primacy to which economic and social objectives are subordinate. Thus, even where they achieve economic or social objectives, economic activities should only be included in the green economy if they unambiguously have a positive impact on environmental objectives. This relationship is illustrated in [Figure 1](#).

For the purposes of establishing a list of environmentally sustainable economic activities, the EU taxonomy for sustainable activities established six environmental objectives⁴ to which green economic activities should make a substantial contribution:

2. <https://www.unep.org/pt-br/node/23750> and <https://eur-lex.europa.eu/EN/legal-content/glossary/green-economy.html>
 3. https://www.oxfordeconomics.com/wp-content/uploads/2023/02/The-Global-Green-Economy-Report-2023_FINAL_10MB-version.pdf

4. EU Taxonomy Regulation, (EU) 2020/852

1. **Climate change mitigation:** e.g., stabilisation of greenhouse gas emissions by avoiding or reducing them, or by enhancing greenhouse gas removals.
2. **Climate change adaptation:** e.g., reduction or prevention of the adverse impact of the current or expected future climate, or the risks of such adverse impact.
3. **The sustainable use and protection of water and marine resources:** e.g., decontamination and/or remediation of soils and groundwater in polluted areas, urban wastewater treatment and sustainable urban drainage systems.
4. **The transition to a circular economy:** e.g., increasing the durability, reparability, upgradability, and reusability of products, or reducing the use of resources via changing the design and choice of materials.
5. **Pollution prevention and control:** e.g., restoration and remediation of pollution in terrestrial ecosystems, soil, and buildings, depollution and dismantling of end-of-life products for material recovery.
6. **The protection and restoration of biodiversity and ecosystems:** e.g., assisting in the recovery of land, freshwater, or marine ecosystem to a good condition, resulting in improved physical and chemical conditions, and agriculture processes and sourcing of products (especially for food and beverage) that maintain or improve biodiversity and ecosystem health.

In parallel, the European Union's platform on sustainable finance is currently working towards a Social Taxonomy that encompasses an array of social topics, yet to be integrated into the current taxonomy.⁵ Although not definitive, the Final Report on Social Taxonomy⁶ from the Platform on Sustainable Finance⁷ articulates the possible scope of three main social objectives⁸:

1. **Decent work (including value-chain workers),** which could cover aspects of promoting decent work, equality and non-discrimination at work, and respect for the human rights and workers' rights of affected workers in the value chain.
2. **Adequate living standards and wellbeing for end-users,** which could cover aspects such as ensuring healthy and safe products and services, protection of personal data and privacy, access to quality products and services (e.g., healthcare, housing, education and lifelong learning, etc.)

3. **Inclusive and sustainable communities and societies,** which could cover aspects of promoting quality and inclusive growth, supporting sustainable livelihoods and land rights, and ensuring respect for the human rights of affected communities.

Green economy principles

Looking beyond green economy objectives *per se*, various authors have tried to establish general principals underlying the green economy (see [Figure 2](#)). These can be seen as attempts to provide further clarity around the interpretation of the green economy concept and to guide practitioners in the application of the concept, and to address perceived risks and concerns.

Green economy taxonomies - the EU Taxonomy for sustainable activities

The rise of green and sustainable finance in recent years has called for the development of green taxonomies that can be used to identify environmentally sustainable economic activities. Notable, in an EU context, is the EU Taxonomy for sustainable activities that provides a classification system of environmentally sustainable economic activities, which are defined as activities that can “*make a substantial contribution to at least one of the EU's climate and environmental objectives⁹, while at the same time not significantly harming any of these objectives and meeting minimum safeguards.*”¹⁰

The aim of the EU Taxonomy is to support investors to finance transition and sustainable projects, and to launch new projects, or upgrade existing ones, by clearly defining what is aligned with the EU environmental goals (i.e., by defining and classifying economic activities that are aligned with a net zero trajectory by 2050 and the broader environmental goals other than climate).

The development of the EU Taxonomy is ongoing. The Taxonomy Regulation, published on 22 June 2020 and applied from 12 July 2020, set 4 overarching conditions that an economic activity must meet to qualify as environmentally sustainable:

1. Make a substantial contribution to at least one environmental objective¹¹
2. Do no significant harm to any of the other five environmental objectives
3. Comply with minimum safeguards
4. Comply with the technical screening criteria set out in the Taxonomy delegated acts.

5. https://www.oxfordeconomics.com/wp-content/uploads/2023/02/The-Global-Green-Economy-Report-2023_FINAL_10MB-version.pdf

6. https://finance.ec.europa.eu/system/files/2022-08/220228-sustainable-finance-platform-finance-report-social-taxonomy_en.pdf

7. https://finance.ec.europa.eu/sustainable-finance/overview-sustainable-finance/platform-sustainable-finance_en

8. For a short summary of the proposed social taxonomy, see: <https://www.bbva.com/en/sustainability/what-is-the-european-unions-social-taxonomy-for-sustainable-finance/>

9. See description of the six environmental objectives provided above.

10. <https://ec.europa.eu/sustainable-finance-taxonomy/>

11. See description of the six environmental objectives provided above

Figure 2: Summary of green economy principles

Type	Principles
Environmental	<ul style="list-style-type: none"> • Protects biodiversity and ecosystems • Invests in and sustains natural capital • Recognises and respects planetary boundaries and ecological limits • Is consistent with the principles of sustainable development / advances international environmental sustainability goals • Adopts a precautionary approach to environmental impacts
Economic	<ul style="list-style-type: none"> • Integrated in economic development and growth models and macroeconomic goals (e.g., through the creation of green jobs, poverty eradication, increased competitiveness and growth in key sectors) • Recognises natural and social capital and values (e.g., through internalisation of external costs, green accounting, whole-life costing, and improved governance) • Promotes sustainable and efficient resource use, consumption, and production (including energy efficiency) • Creates decent work and green jobs
Social	<ul style="list-style-type: none"> • Delivers poverty reduction, well-being, livelihoods, social protection and access to essential services • Is socially inclusive, democratic, participatory, accountable, transparent, and stable • Is equitable, fair, and just – between and within countries and between generations. • Adopts a precautionary approach to social impacts

Source: adapted from UN DESA¹² and European Environmental Agency¹³

In June 2021, the Commission published a Delegated Regulation¹⁴ establishing the technical screening criteria for determining the conditions under which an economic activity qualifies as contributing substantially to climate change mitigation or climate change adaptation and for determining whether that economic activity causes no significant harm to any of the other environmental objectives. Further, on the 13 June 2023, the European Commission approved in principle a new set of EU Taxonomy criteria covering the four remaining environmental sustainability objectives: sustainable use and protection of water and marine resources; transition to a circular economy; pollution prevention and control; and protection and restoration of biodiversity and ecosystems.

Currently, the Taxonomy covers activities the following sectors:

- Forestry
- Environmental protection and restoration activities
- Manufacturing
- Energy
- Water supply, sewerage, waste management and remediation

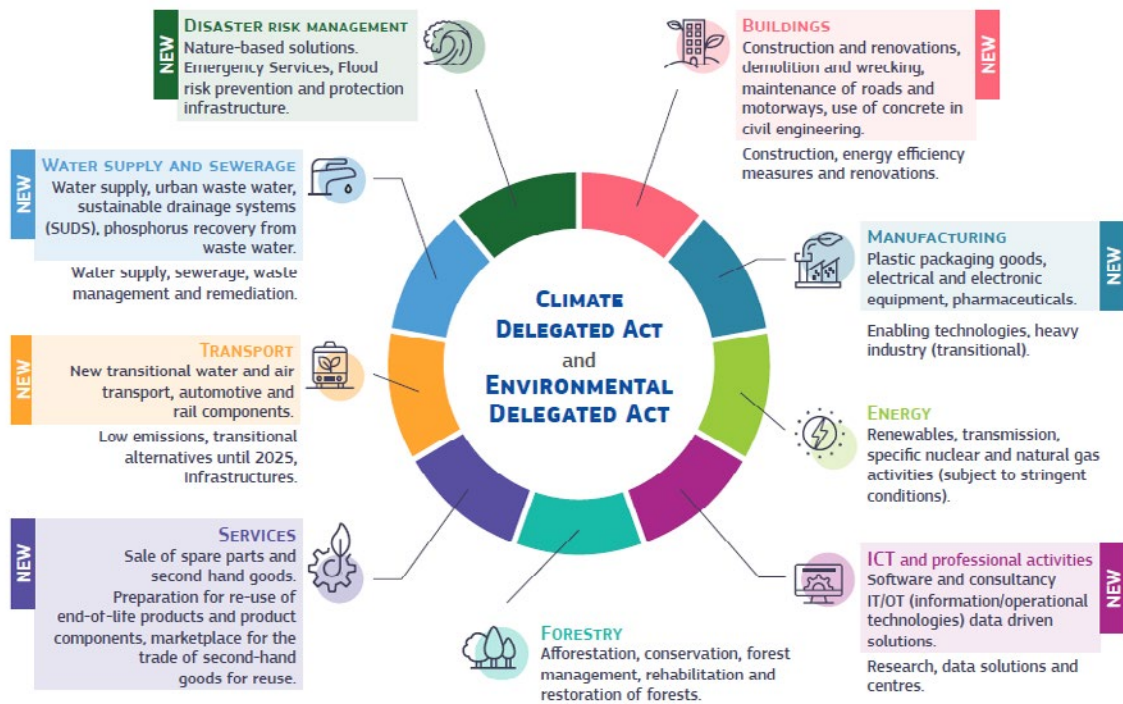
- Transport
- Construction and real estate
- Disaster risk management
- Information and communication
- Professional, scientific, and technical activities
- Financial and insurance activities
- Accommodation activities
- Education
- Human health and social work activities
- Arts, entertainment, and recreation

An overview of some of the key sectors and activities covered by the Taxonomy is shown in [Figure 3](#):

12. UN DESA (2012), A Guidebook to Green Economy: Issue 2: Exploring Green Economy Principles, available at: <https://sustainabledevelopment.un.org/content/documents/743GE%20Issue%20nr%202.pdf>

13. <https://www.eea.europa.eu/publications/europes-environment-aoa/chapter3.xhtml/#note22>

14. (EU) 2021/2139

Figure 3: EU Taxonomy - sectors and activities covered

Source: European Commission (2023)¹⁵

The European Commission has developed tools to help users better understand the EU Taxonomy in a simple and practical manner (see [EU Taxonomy Navigator](#)), although these currently only cover activities contributing to climate change mitigation or climate change adaptation objectives.¹⁶

The EU Taxonomy is intended to be a living document and will continue to evolve, with more activities being added to its scope over time. Moreover, the European Commission will regularly review technical screening criteria with the aim to reflect technological progress, new scientific evidence, and future EU policy developments. To date, the prioritisation of activities included in the Taxonomy has reflected the advancement of technical screening criteria to comply with the requirements of the Taxonomy Regulation. This means that some sectors and activities for which the development of screening requirements needs more time are not yet covered; notably, despite being indispensable for many strategic industries, mining and refining of raw materials is not yet covered by the Taxonomy.

Green economy sectors in the Hungarian context

It appears that there is no formal definition of the green economy developed for Hungary. The Green National Champions program, launched in 2020, does not explicitly define the green economy. However, Annex 7 of the call for proposals lists industries that can support the green economy, which is summarised in [Figure 4](#).

15. Factsheet: Sustainable finance - Investing in a sustainable future https://finance.ec.europa.eu/document/download/fbb0ae0d-3615-4c7d-b71e-dd5288c3027_en?filename=230613-sustainable-finance-factsheet_en_0.pdf

16. The list of activities, their description and technical criteria compliant with the EU Taxonomy prepared by the Technical expert group on sustainable finance (TEG) can be found under this [Link](#).

Figure 4: Green National Champions – supported industries

Industries and indicative products services and activities	
I	<p>Domestic manufacturing companies serving energy efficiency improvements</p> <p><i>Domestic enterprises that can serve energy efficiency improvements with their products and services, including provision of verifiably essential elements for such products and services.</i></p> <ul style="list-style-type: none"> a. Solar panels and solar collector systems; b. Boiler systems (including biomass boilers); c. Heat pump and heat recovery systems; d. Thermal insulation of building envelope structures other than openings; e. Building envelope structures that are open-frame structures; f. Complete heating, cooling and domestic hot water system; g. Lighting system; h. Shading and screening structure; i. Smart meters; j. Products for energy storage; k. Energy efficient and environmentally conscious building structures.
II	<p>Domestic manufacturing companies related to water efficiency</p> <p><i>Domestic manufacturing enterprises that increase water use efficiency, water efficiency, water use reduction or water treatment related products, or develop technology</i></p> <ul style="list-style-type: none"> a. Water-saving devices and technologies (e.g. toilet flushing tanks, domestic waterworks, closed industrial water jet cutting systems, etc.); b. Water treatment related products and technologies; c. Water efficiency devices (e.g., faucets, showerheads, irrigation systems, etc.); d. Equipment for water retention and/or recycling (e.g. water catchment and retention systems, water purifiers, grey water recycling systems, etc.).
III	<p>Domestic manufacturing companies related to electromobility</p> <p>Domestic manufacturing companies that produce products related to the development of electromobility</p> <ul style="list-style-type: none"> a. electric vehicles; b. energy supply for electric vehicles; c. manufacturers of products that facilitate transport and transport infrastructure (e.g. electric motors, charging systems, batteries, power electronics (semiconductor circuits power electronics (semiconductors for current regulation and control), docking stations, etc.)
IV	<p>Manufacturers producing and/or using raw materials from secondary sources</p> <p><i>Note: to qualify concepts must justify the origin, type and extent of use of the by-product or waste (percentage of raw material/ finished product used in the production process from secondary source raw material).</i></p> <ul style="list-style-type: none"> a. use or reuse by-products or waste materials from their own processes or from other companies for the production of raw materials; b. use by-products or waste material from their own process or from another company as the main raw material in their production activities to produce a finished product (industrial symbiosis relationship).
V	<p>Undertakings manufacturing end-products replacing single-use and other plastic products</p> <p>Covers domestic production enterprises involved in the production of disposable and certain other plastic products, as well as substitute products, which have been affected by the marketing ban and have lost market share in the plastics sector for other reasons. The objective is to support the production of end-products which are substitutes for single-use plastic products, that are either reusable or can be composted in a certified manner.</p>

Good practices and common opportunities and barriers for green economic diversification and adaptation

Introduction

Although SMEs have a relatively small individual environmental and carbon footprint, their aggregate contribution to greenhouse gas emissions is significant, estimated at 50-70% of the GHG emissions of the business sector¹⁷. With the growing urgency and ambition in climate policy, it is increasingly clear that SMEs must play a central role in the green transition. Moreover, many SMEs were negatively impacted by the high energy prices caused by the recent energy crisis, which harmed their profits and forced them to increase prices of their goods and services. In that context, many SMEs view energy efficiency and the renewable energy transition as the pathway out of the energy crisis.¹⁸ Indeed, one of the key drivers for SMEs to green their activities are the prospect of cost reduction. Another important factor is changing consumer demand. At the same time, SMEs face various barriers that prevent them from adopting greener solutions in their businesses. Those include lack of awareness, information and knowledge, limited resources (in terms of skills, finance and/or technology) for greening activities, and uncertainties regarding policies and future regulatory changes (OCED, 2021)¹⁹. Policy-makers increasingly recognise the importance of SMEs and entrepreneurs for reaching the climate objectives and put in place different policies aiming at improving environmental performance of SMEs. The types of policy instruments/programmes used to enable the greening of SMEs include:

- Information based instruments (advice, dissemination of good-practices, networking)
- Economic incentives and financial instruments (such as grants and loans)
- Regulatory tools

The reviewed good practices in terms of support mechanisms offered to SMEs to green their activities, reveal some lessons learnt for policymakers about how to effectively support SMEs green transition.

- **Understanding the local context is important.** For example, the city of Glasgow has taken its first steps in creating a stronger more sustainable economy by completing the Circle City Scan - an analysis of the city's material flows which allowed for identification of leading industries through which the city's economy can become more 'circular' and defined implementation strategies and opportunities for the region's business community. Such exploratory studies provide common understanding of the local context and concrete challenges and opportunities and can lead to a concrete action plan, which facilitates implementation of circular economy solutions.
- **Programmes integrating different types of measures provide more effective support to SMEs.** Partnering with complementary organisations allows for the support scheme to combine financial (e.g., grants) and non-financial (e.g. one-on-one advice) support. In the case of Coventry and Warwickshire Green Business Programme, in addition to providing direct energy and resource efficiency support in the form of grants, the Programme worked with other key partners in the region to ensure SMEs receive other types of support, including free energy and resource efficiency audits to help identify energy, water and waste savings, membership of the Green Business Network, access to other specialist support to enable growth and innovation, as well as free events, workshops and one to one support.
- **Using existing structures facilitates effective outreach to SMEs.** In the case of Energy Efficiency Incentive programme introduced in Sweden, making use of an existing, well-established channel of the environmental supervisory structure as the vehicle for the new project allowed it to focus on quickly meeting the needs of SMEs. Using this channel meant that different industries could be effectively reached in the same way, reducing differences between industries in energy efficiency. Moreover, involving chambers of commerce allow initiatives to build on existing networks and facilitates outreach to its membership, including many SMEs, as in the case of Glasgow Chamber of Commerce.
- **Creating networks helps to build the community of companies,** share knowledge and provides networking and supply chain opportunities for the participating SMEs. For example, Be Circular initiative in Brussels includes an online platform that enables all the stakeholders involved to exchange information online and report on progress and Coventry and Warwickshire Green Business Programme offered its participants free membership to the Green Business Network and multiple networking opportunities.

17. <https://www.oecd.org/cfe/smes/oecdplatformonfinancingsmesforsustainability-annualconference.htm>

18. https://beyondfossilfuels.org/wp-content/uploads/2023/07/BFF_SME-EnergyCostsSurvey_Final.pdf

19. <https://www.oecd.org/publications/no-net-zero-without-smes-bab63915-en.htm>

- **An inclusive, collaborative approach, coupled with clear political endorsement** strengthens engagement and commitment with the initiative. The Brussels government's recognition and endorsement of circular economy has played an important role in giving entrepreneurs and businesses the confidence and momentum to apply new ways of operating and opened up additional networks and partnerships. The inclusive, collaborative approach, coupled with clear political endorsement, has worked to strengthen engagement and commitment with the initiative. As awareness of the opportunities and benefits of a circular economy has grown, the approach has also created a climate of cross-cutting innovation.
- **Sharing successful examples** to inspire others via promotional/award events, workshops, and social media helps to raise awareness of the need for green adaptation as well as of the supporting instruments available to SMEs.

In terms of impacts of the analysed programmes, which targeted mostly energy efficiency and circular economy solutions, most of them contributed to a reduction in energy costs and a decrease in carbon footprint/CO₂ emissions. Some case studies revealed that adoption of circular economy approach can lead to a new source of income, additional job creation and development of a new product. Finally, when SMEs adopt green practices in their business, their employees' awareness of the environmental and climate impacts increases, which can have positive spillover effects on their personal behaviour and consumer choices.

Good practice case studies:

Coventry and Warwickshire Green Business Programme, 2016 - 2023

United Kingdom

<https://www.coventry.gov.uk/coventry-warwickshire-green-business-programme>

The Coventry and Warwickshire Green Business Programme supports businesses with fewer than 250 employees based in Coventry and Warwickshire in maximising low carbon economy opportunities and thus enabling savings in energy, waste and water bills. Support is provided through grant-funded programme, which includes:

- Energy and resource efficiency grants of value between £1,000 and £50,000 (with 40% intervention) for:
 - Lighting – LED, controls, sensors
 - Heating - replacement boilers
 - Compressors
 - Ventilation – fans, distribution
 - Refrigeration
 - Renewable technologies – solar PV
 - Recycling and waste - compactors, balers and crushers
 - Energy Efficient Machinery
- Free energy and resource efficiency audits to help identify energy, water and waste savings
- Free membership to the Green Business Network
- Access to other specialist support to enable growth and innovation
- Free events, workshops and one on one support

Important outputs / results / achievements	<p>Since 2016 the following outcomes were achieved:</p> <ul style="list-style-type: none"> • £2.5m of grants have been awarded to 213 SMEs; • Over 14,000 tonnes of CO₂ have been saved; • 60 new jobs have been created; • 150 SMEs have received non-financial support; • 1,450 SMEs have joined the Green Business Network
Type of policy instrument	Information based instruments (networking, advice, events, workshops) and financial incentive (grants)
Budget	£5.2m (ERDF funding)
Key success factors/ lessons learnt	<p>The Programme was built upon the success of previous business support Programmes across the region. In addition to providing direct energy and resource efficiency support, the Programme worked with key partners in the region such as other Council Programmes, CWLEP Growth Hub, and CW Chamber of Commerce to ensure SMEs receive the best offering available to them as part of an integrated customer journey.</p> <p>Building partnerships, cross referrals, social media and a strong communication plan were key to ensure that the programme could reach different companies, industries and sectors. Partnering with other organisations with complimentary capacities and offerings allowed for the support scheme to combine financial and non-financial support, which delivered a cohesive support package to the SMEs willing to improve their energy and resource efficiency.</p> <p>The programme also allowed businesses to join the Green Business Network where they could share ideas and promote energy, resource, waste and water efficiency as well as engage on low carbon, environmental and green sustainability initiatives, which built the community of companies and provided networking and supply chain opportunities for the participating SMEs.</p>
Additional Information Sources	<p>https://www.coventry.gov.uk/coventry-warwickshire-green-business-programme/coventry-warwickshire-green-business-programme-1/8</p> <p>https://carboncopy.eco/initiatives/coventry-warwickshire-green-business-programme</p>

Case study: Design engineering consultancy saves £5,000 per year on energy bills

GRM Consulting is a small design engineering consultancy based in Leamington, United Kingdom which pledged in 2021 to become carbon neutral by 2040. The SME had applied for the Coventry and Warwickshire Green Business Programme and received the support which consisted of a free energy and resource efficiency audit and a grant worth £10,000 towards the cost of a new LED lighting system, roof over-cladding and a solar PV system. The new solar PV included 81 solar panels which will produce up to 85% of the firm's annual energy consumption and part of it will be used for the EV charging stations installed in the car park to encourage the 13 members of staff to switch to electric cars.

It was estimated that the improvements made, and the installation of the PV system will help the firm save over £5,000 per year in the costs of energy bills and reduce their carbon footprint by over nine tonnes of CO₂ emissions per year bringing them closer to the objective of reaching carbon neutrality by 2040.

Energy Efficiency Incentive programme, 2016 – 2021

Sweden

https://ec.europa.eu/regional_policy/en/projects/Sweden/helping-swedish-smes-become-more-energy-efficient

The overall goal of programme was to help SMEs that are subject to environmental supervision to reduce their energy use. The Energy Efficiency Incentive programme accompanies regulatory requirements on energy management of Sweden's Environmental Code. The programme built on the existing administrative structure for environmental supervision of companies.

Environmental supervisors were trained to provide constructive advice on energy efficiency (with a focus on methods, tools and use of the communications materials) to the companies they audit. The advice was targeted at SMEs and concerned both the monitoring of energy use as well as the implementation of energy-saving measures. At the same time, training materials, guides, and examples of good practices were prepared and made available on the [website](#) of the Energy Authority, including inspirational films with examples of companies that have succeeded in implementing their energy efficiency measures.

Important outputs / results / achievements	<p>Between March 2016 and January 2020:</p> <ul style="list-style-type: none"> • 700 environmental supervisors were trained to advise on energy efficiency measures • 2,000 SMEs were visited, and 422 supported in planning and implementing energy efficiency measures • Guidance materials on best technology for different industries (including industry-wide guides) were developed
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Type of policy instrument	Information-based instruments: advice to individual SMEs, dissemination of information on compliance and good-practices
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Budget	8.46 million EUR (of which 4.23 million EUR from ERDF)
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Key success factors/ lessons learnt	<p>Making use of an existing, well-established channel of the environmental supervisory structure as the vehicle for the new project allowed it to focus on meeting the needs of SMEs. The programme focused on developing comprehensive training and communications materials, rather than having to invest in a separate delivery mechanism. At the same time, using this channel meant that different industries could be reached in the same way, reducing differences between industries in energy efficiency.</p> <p>The environmental inspectors were trained in energy efficiency and the motivational conversation methodology to focus less on discussions about laws and clauses and more on coaching the companies to find their own ways to reduce their energy use. Also, with supervisors being able to assist and advise SMEs on both environmental and energy matters, companies were better supported in taking a holistic approach – when companies became more energy efficient, they lowered their costs, strengthened their competitiveness and at the same time protected the environment. As a result, companies can comply with the requirements set by the Environmental Code for companies to save energy and mainly use renewable energy sources.</p>
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Additional Information Sources	<p>https://www.energimyndigheten.se/energieffektivisering/lagar-och-krav/miljobalken/vagledning-for-verksamhetsutovare/</p> <p>https://www.energimyndigheten.se/arkiv-for-resultat/Resultat/energiutbildade-miljoinspektorer-hjalper-tusentals-foretag-att-energieffektivisera/</p> <p>https://www.youtube.com/playlist?list=PLrkMyKdxSCv2uFKWGzTq8u6-ozxi3fzUl</p>
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Case study: Bandstål AB cuts heating costs from 600,000 to 100,000 SEK

Bandstål AB is a Swedish steel processing company. It cuts the raw material from steel mills into bands of sheet metal that are usable for the manufacturing of car parts. The company requires large warehouses to store their materials and final products. With support of the Energy Efficiency Incentive programme, the temperature control of the warehouses was made more energy efficient, cutting the costs for district heating. This used to be up to 600,000 SEK (about 50,000 €) a year and could be reduced to just over 100,000 SEK. The measures included better heat insulation, introduction of LED lighting, replacement of control valves of the HVAC system, and the installation of automatic gates, which allowed for easy use while minimising the exchange of warm and cold air. The company also raised awareness of energy-saving work routines among its employees.

KfW Energy Efficiency Programme – Production Facilities and Processes, 2015 - ongoing

Germany

<https://www.kfw.de/PDF/Download-Center/Konzernthemen/Research/PDF-Dokumente-alle-Evaluationen/Evaluation-KfW-Effizienzprogramm-f%C3%BCr-die-F%C3%B6rderjahre-2017-und-2018.pdf>

The Energy Efficiency Programme of the KfW (German Development Bank) helps commercial enterprises to implement energy efficiency measures with reduced-interest loans of up to 25 million EUR per project. Funding is available for investments in production facilities, process technology, cross-cutting technologies, heat recovery and the utilisation of waste heat, as well as combined heat and power plants. All investments must generate certain minimum energy efficiency requirements, namely 10 % compared to the average energy use over the last 3 years. In case of new installations, the reduction is measured against the industry average. Projects generating at least 30 % energy savings receive improved funding conditions.

Important outputs / results / achievements	<p>From 2017 to 2018 the following results were achieved:</p> <ul style="list-style-type: none"> • A total of 1,401 projects were supported (around 75 % of which are estimated to be in SMEs) with a lending volume of € 3.2 billion • Total annual energy savings of 1.3 TWh • Energy efficiency gains led to annual energy cost savings of around € 88 million. • Annual reduction of greenhouse gas emissions of 543 thousand tonnes CO₂ equivalent • Gross value creation effects totalling around € 1.7 billion in Germany. Around 22,000 jobs secured or created for one year in Germany. Around two thirds of the effects on employment occur in manufacturing, 16 % in business services and 12 % in the industries ‘wholesale and retail trade, transport, hotels and restaurants’. Around half of the jobs secured or created were in SMEs.
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Type of policy instrument	Economic and financial incentives: reduced interest loans
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Budget	€3.56 billion in loans (2017 and 2018)
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Key success factors/ lessons learnt	The Energy Efficiency Programme is embedded in a broad range of financing programmes offered by the KfW, including several in the field of sustainability, environmental protection, and energy efficiency. The KfW is a long-established and well-known institution with the necessary outreach and expertise to implement large funding and loan programmes.
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Additional Information Sources	<p>https://www.kfw.de/inlandsfoerderung/Unternehmen/Energie-Umwelt/F%C3%B6rderprodukte/EE-Produktion-292/</p> <p>https://www.kfw.de/inlandsfoerderung/Unternehmen/Energie-Umwelt/F%C3%B6rderprodukte/Klimaschutzoffensive-f%C3%BCr-den-Mittelstand-(293)/</p>
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Case study: DGW taps into new business opportunities by using waste heat

DGW (Deutsche Gasrußwerke) is a medium-sized chemical company with about 140 employees established in Dortmund in the Ruhr region. DGW produces carbon black for industrial use, in particular in the production of rubber for car tyres. The production process produces large amounts of heat in the form of steam that would usually be blown off into the environment. However, when the city of Dortmund converted its local heat network to rely on industrial waste heat instead of a dedicated plant, DGW took the opportunity to participate and installed two steam condensers that feed DGW's waste heat into the local network. For this investment, which is expected to save up to 45,000 tons of CO₂ per year, the company received a loan of €1.6M from the KfW. While energy generation remains a side business for DGW, the company nevertheless taps into a new source of income.

<https://www.kfw.de/inlandsfoerderung/Unternehmen/Energie-Umwelt/Fallbeispiele/Abw%C3%A4rme-als-neue-Einnahmequelle/>

'Be Circular': Regional Circular Economy Programme, 2016 - 2020

Brussels-Capital Region, Belgium

<https://environnement.brussels/pro/nos-actions/plans-et-politiques-regionales/be-circular-programme-regional-deconomie-circulaire>

The 'Be Circular' programme comprised a list of 111 actions taken by the regional government, various public agencies, private and non-profit organisations. The actions were divided into four groups: i) Cross-functional measures, ii) Sectorial measures, iii) Territorial measures and iv) Governance measures. The initiative focused on five key economic sectors: retail, logistics, waste and resources, food, construction, and the built environment.

The actions included:

- **Direct financial support for businesses:** E.g., call for projects (€1M) for businesses to implement new circular economy models; fund of €500k for businesses to adopt circular economy practices.
- **Indirect municipal support:** Awareness raising and educational activities; subsidised collaborative workspaces, with wider services such as on-site lawyers, through the 'Greenbizz' program; guidance for businesses by existing institutions (e.g., guidance for startups to test their business idea in the construction sector; business organisation for SMEs; help in applying for funding; implementation of synergies)
- Be Circular also includes an **online platform** that enables all the stakeholders involved to exchange information online and report on progress.

Important outputs / results / achievements	By 2019, 194 organisations had received financial aid for a total amount of €11.5 million, 207 workshops had been organised with a total of 5,500 participants, 319 organisations had received non-financial business aid, 3,000 people had been able to follow training.
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Type of policy instrument	Information-based instruments (advice, training) and economic incentives (grants)
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Budget	€13M per year
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Key success factors/ lessons learnt	<p>The Brussels government's recognition and endorsement of the circular economy has played an important role in giving entrepreneurs and businesses the confidence and momentum to apply new ways of operating, and opened up additional networks and partnerships. The inclusive, collaborative approach, coupled with clear political endorsement, has worked to strengthen engagement and commitment with the initiative. As awareness of the opportunities and benefits of the circular economy has grown, the approach has also created a climate of cross-cutting innovation.</p> <p>The creation of a central coordinating committee, made up of the three ministries and four public agencies, has helped to steer the initiative, track progress and maintain momentum.</p> <p>Brussels partnered with UN Environment to be a pilot city within GI-REC, a collaborative platform provided by UN Environment to help cities develop resource efficient economies. The engagement supports inter-city knowledge exchange and has provided Brussels with a deeper material flow analysis.</p>
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Additional Information Sources	<p>http://circulareconomy.brussels/chronologie/images/chronologie/PREC_%20EVALUATION-Mi-Parcours.pdf</p> <p>https://environnement.brussels/pro/nos-actions/plans-et-politiques-regionales/be-circular-programme-regional-deconomie-circulaire</p> <p>https://ellenmacarthurfoundation.org/circular-examples/regional-programme-for-a-circular-economy-brussels</p> <p>https://www.circulareconomy.brussels/mister-genius-dropstore-collecte-et-reemploi-de-materiel-informatique/</p> <p>https://www.youtube.com/watch?v=5My4pgYiCGY</p>
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Case study: Mister Genius implements a collection and resale system for used electronics

Mister Genius operates a number of local IT stores across Brussels and the Wallonia region. The company is specialised in IT support and repair, either in-store, via courier, or remotely. In 2016, its project "Dropstore" was selected as one of the "laureates" of the Be Circular programme to receive financial support and advice by Impulse.brussels. Dropstore within Mister Genius serves as a collection point for used electronics, which are then repaired or refurbished and resold for further use. Where devices cannot be repaired, Mister Genius may nevertheless extract usable parts for other repair activities. That way, the company is able to reduce the number of new parts ordered from abroad.

Green Deal approach, 2011 – ongoing

Netherlands

<https://www.rijksoverheid.nl/onderwerpen/duurzame-economie/green-deal>

Green Deals are agreements between the Dutch government and companies, civil society organisations or public bodies which aim to implement a specific innovative sustainability solution. The government can take various roles in these agreements, notably it can agree to amend laws or regulations to remove regulatory barriers, or it can bring together various parties and act as a mediator between them. The Green Deal approach (not to be confused with the European Green Deal) was launched in 2011. Private parties can submit their initiative, the government will consider if it fulfils a range of criteria, in particular:

- The initiative ensures green growth and is expected to turn a profit.
- The initiative experiences obstacles in its implementation and the national government can play a role in removing these.
- The initiative is feasible and preferably leads to results within 3 years.

Important outputs / results / achievements

Between 2011 and 2021:

- 235 Green Deals registered involving 1,891 parties
- Majority of deals concluded with private companies; most commonly in the field of energy

Evaluation identified effects on three levels:

- Process: establishment of collaborative networks
- System: removal of regulatory barriers, promoting green growth
- Sustainability/economy: Green Deals contributed to growth and sustainability of the economy in various ways. However, these effects could not be quantified at the level of all Green Deals combined

Type of policy instrument

Regulatory tools: Simplification of regulatory requirements

Budget

-

Key success factors/ lessons learnt

The initiative recognises the unique positions of private and public actors in developing a green economy. The official endorsement by a Green Deal gives private initiatives additional legitimacy and visibility. Officials also feel legitimised to support sustainable solutions and remove barriers through their work.

Additional Information Sources

<https://www.greendeals.nl/>

Case study: Sustainability of the concrete supply chain

Nearly twenty parties in the Dutch construction industry, primarily construction companies and business associations, have worked together in the Green Deal for making the concrete supply chain more sustainable. The initiative covered all links in the Dutch concrete chain and is not only about the concrete product, but also about concrete structures. The project partners adopted a broadly supported and independent definition of sustainable concrete. They also set up a WIKI and a coordination platform. Important themes were energy use and emissions into soil, water, and air, but also extraction and consumption/reuse of raw materials and the impact of business and production on biodiversity and ecosystems. The government participated in the stakeholder dialogue to give the new definition the broadest possible support and legitimacy. It furthermore committed to reviewing legislation for potential obstacles to the use of sustainable concrete and it helped in identifying relevant funding opportunities.

<https://www.greendeals.nl/green-deals/verduurzaming-betonketen>

Circular Glasgow, 2015 - ongoing

Glasgow, United Kingdom

<https://www.circularglasgow.com/>

Circular Glasgow is an initiative of the Glasgow Chamber of Commerce supported by Zero Waste Scotland and Glasgow City Council. The initiative set out in 2015 with a Circle City Scan that led to a vision and an action plan for Glasgow's business sector. It outlined practical steps to work towards supporting economic development, innovation, increasing competitive advantage, resource recovery and reuse, and carbon emission reductions.

Circular Glasgow today offers various opportunities for networking and knowledge exchange to companies that are engaging in circular business activities or are interested these. They organise workshops and events as well as Circle Lab, an online hackathon. The initiative also provides resources and guidance on financing. Circular Glasgow has built a group of 19 ambassadors from businesses across Glasgow to share their experience and knowledge of the circular economy.

Important outputs / results / achievements	<ul style="list-style-type: none"> • Circular Glasgow has engaged with over 650 businesses through its activities and support mechanisms • The learnings from the business-led initiative led to the adoption of the Circular Economy Route Map for Glasgow by the City Council in 2020 • Other cities are building on the initiative's experience, spurring initiatives such as Circular Tayside (Dundee, Perth & Angus); Circular North East (Aberdeen and Aberdeenshire); and Circular Edinburgh
Type of policy instrument	Information-based instruments: Networking and cooperation among SMEs; Dissemination of information on compliance and good-practices
Budget	Not available
Key success factors/ lessons learnt	<ul style="list-style-type: none"> • Circular Glasgow as an initiative of the Chamber of Commerce focuses on the advantages and opportunities for businesses of engaging in circular economy models. • The Glasgow Chamber of Commerce can build on its existing network and outreach to its membership, including many SMEs. • The Circle City Scan as a starting allowed the initiative to depart from a common understanding of the local context and concrete challenges and opportunities.
Additional Information Sources	<p>https://www.oecd.org/fr/publications/the-circular-economy-in-glasgow-united-kingdom-7717a310-en.htm</p> <p>https://www.glasgow.gov.uk/councillorsandcommittees/viewSelectedDocument.asp?c=P62AFQDNDX2UT1NTNT</p> <p>https://www.climate-kic.org/wp-content/uploads/sites/15/2018/12/Municipality-led-circular-economy-case-studies-compressed-ilovepdf-compressed.pdf</p> <p>https://www.circularglasgow.com/wp-content/uploads/2022/03/Glasgow-City-Scan.pdf</p> <p>https://www.circularglasgow.com/wp-content/uploads/2022/01/20220128-Glasgow-Net-Zero-1.pdf</p> <p>https://www.zerowastescotland.org.uk/resources/circular-glasgow</p> <p>https://pureportal.strath.ac.uk/en/projects/circle-glasgow2</p>

Case study: EGG Lighting supplies resource-saving lighting fixtures

EGG Lighting is a small enterprise based in Glasgow that supplies commercial-scale lighting fixtures. Both the company's business model and the lighting materials it employs are designed with the aims of material and energy efficiency, sustainability, and future-proofing in mind. EGG helps its client to move from fluorescent lighting to energy efficient LED Lighting and smart sensor technology. In addition, EGG operates with a products-as-a-service and circular design model. Rather than owning the fittings and bulbs themselves, customers pay EGG for the lighting service provided. This shift has taken operations from linear to circular. When a light needs to be repaired, instead of the entire unit being disposed of, EGG simply replenishes the part of the unit that needs to be replaced, which means less waste. When a fixture does eventually reach the end of its life, EGG, uniquely positioned and experienced to refurbish it, puts it back into the lifecycle. For EGG, the product-as-a-service model offers the additional advantage of a secure stream of income.

<https://www.circularglasgow.com/story/egg-lighting/>

<https://www.zerowastescotland.org.uk/resources/egg-lighting>

Norway Grants support SMEs to increase value creation and sustainable growth in the Bulgarian business sector, 2018 - ?

Bulgaria

<https://eea.innovationnorway.com/article/bulgaria-business-development-innovation-and-smes>

Business Development, Innovation and SMEs Bulgaria was a business development programme aiming to increase value creation and sustainable growth in Bulgarian business sector. The programme included the following areas of support:

- Innovative technologies, processes and services
- Sustainable business development
- Greening of existing businesses and processes
- Development and implementation of innovative products and services

Business Development, Innovation and SMEs Bulgaria sought to stimulate and develop long-term business cooperation between Norway and Bulgaria based on business development and innovation. The aim was to allocate 75% of the funding to small and medium-sized enterprises with a priority to be given to bilateral partnership projects offering added value. The Programme consisted of two focus areas: Green Industry Innovation (at least 50% of funding will be allocated to GII) and Welfare Technology.

Important outputs / results / achievements

- 87 applications were received under the second call for proposals focussed on the Green Industry Innovation area. The total budget of these project applications was €109 million, the total grant amount requested was more than €54 million (five times more than the available funding). The total budget of the call was €10 million.

Type of policy instrument

Financial incentive (grants)

Budget

The program funding was €28,500,000 and was funded entirely by the Norway Grants.

Key success factors/ lessons learnt

- Through the development of sustainable business initiatives in the private sector, the programme contributed to increasing private enterprises' competitiveness and sustainable growth and aimed at increasing profit and creating new jobs by using innovative and environmentally friendly production patterns.
- The Business Development, Innovation and SMEs programme area served as a bridge between research programmes and business development close to market technologies. The programme area stimulated the productivity and competitiveness of European businesses through technology and includes innovative, processes and services. Investments in innovation strengthen economic growth and employment in all business areas and inspire environmental and eco-sensitive management and production

Case study: Recycled neoprene for wetsuits in a circular economy approach to water sports

The small Bulgarian company, WavErest is one of few companies in the Balkans specialised in neoprene apparel for water sports. Together with Norwegian partner Pivot Industridesign, WavErest has developed a way to recycle laminated neoprene foam into new materials and products. Currently, more than 95% of the globally produced wetsuits are non-biodegradable and chemical-based. The objective of the project is to increase the company's competitiveness through a better use of the neoprene waste generated at the company and maintaining the economic value of the products, materials and resources. The Norwegian partner in the project, Pivot Industridesign AS, was involved in know-how transfer and expertise while assessing the recycled material features, the industrial design of yoga mats, which is part of the RAW brand. The two companies also cooperated in an exploratory industrial design of two more items, suitable for manufacturing from recycled neoprene.

The assumption is that more than 15 tons of neoprene waste will be collected and recycled during the first two years of the project implementation, leading to approximately 34,500 CO₂ per year not emitted. The amount of processed neoprene waste will gradually increase in the subsequent years to 40 tons and save up to approximately 92,000 CO₂ emissions each year.

After a series of independent analyses, data collections and tests in the last couple of years, WavErest found a way to recycle laminated neoprene foam into new material. At present, the feasibility of the process has been proven, and a prototype of the final product has been developed. According to the results obtained, the material performs excellently in terms of key qualities, e.g. strength, flexibility, sponginess and traction and is indistinguishable from a virgin neoprene.

Following its strategy to increase production capacity, improve processes, develop new products, and minimise the negative environmental footprint from production, the company invested in a new production line to recycle the neoprene waste and produce recycled neoprene products.

Green National Champions Program, 2014-2020; 2021-2028

Hungary

<https://www.palyazat.gov.hu/ginop-plusz-131-21-zld-nemzeti-bajnokok-a-zldgazdasg-terletrn-mkd-mikro-kis-s-kzpvllalkozsok-technologiafejlesztsnek-tmogatsa-1#>

The objective of the Green National Champions Program, as part of the Future Hungarian Multinationals Program (GINOP-1.3.1-21), is to support technology change developments in high-growth potential manufacturing companies related to the green economy and industry. The program emphasises that the growing green economy requires greater involvement on the part of local micro, small and medium-sized enterprises.

In terms of economic sectors, the program focused only on manufacturing. The following sectors were eligible for the programme.

- Domestic manufacturing companies serving energy efficiency improvements (e.g. solar panel and solar collector system; heat pump and heat recovery systems; thermal insulation of building envelope structures other than openings; lighting system; smart meters; products for energy storage)
- Domestic manufacturing companies related to water efficiency (e.g. water-saving devices and technologies (e.g. toilet flushing tanks, domestic waterworks, closed industrial water jet cutting systems, etc.); products and technologies related to water treatment; water efficiency devices)
- Domestic manufacturing enterprises related to electromobility (e.g. electric vehicles; manufacturers of products that facilitate transport and transport infrastructure, electric motors, charging systems, batteries, power electronics (semiconductor circuits for current regulation and control), docking stations, etc.)
- Secondary source manufacturing enterprises producing and/or using raw materials
- Undertakings manufacturing finished products replacing single-use and other plastic products

Important outputs / results / achievements	<ul style="list-style-type: none"> • The programme provided HUF 23 150 million to support the development of manufacturing enterprises with high growth potential related to the green economy and industry, and to promote technological change. • The maximum level of support was 50%. • Under the call for proposals, 64 enterprises in the green economy sector, received conditional grants of between HUF 20 million and HUF 1 500 million for their technological development. • Of these, seven applications are in the counties concerned by the Just Transition, with only one winning application in Heves County. • Most successful applications were submitted from the Central Transdanubian region
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Type of policy instrument	Financial incentive (grant + financial instrument)
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Budget	HUF 12.3bn (ERDF) – 2014-2020 HUF 30bn (ERDF) – 2021-2028
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Key success factors/ lessons learnt	<p>The program provides supports for the technological development of micro, small and medium-sized enterprises in the green economy.</p> <p>This was the first call for proposals under the GINOP program to support the green economy and the circular economy with a specific focus on SMEs.</p> <p>The program has been focused on manufacturing companies supporting energy efficiency investments, producers using raw material from secondary sources, companies that can improve water use efficiency or strengthening the industrial suppliers of electro-mobility investments.</p> <p>The program has been specifically focused on production and manufacturing.</p>
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Additional Information Sources	https://znb.ifka.hu/
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Case study: Building component manufacturing technology system for the recycling of construction waste

From an environmental point of view, instead of storing waste permanently, if the generation of waste cannot be prevented in any way, it is more appropriate to recover and reuse it. The increased generation of waste materials and the environmental pollution caused by the construction and demolition of buildings mean that new solutions must be found for sustainable development. The reuse of waste materials is a new solution to environmental and ecological problems. The development is based on the implementation of a technological system capable of producing new construction materials and components from sorted and mixed pre-shredded or ground construction waste. The main component of the system is a recycled building element production plant, which is capable of producing concrete-based building elements using different construction waste materials. During the operation of the system, the different conventional and recycled raw materials are fed into the mixing system by an automatic raw material feeding system, according to a defined mixing ratio. In the mixer, different innovative raw material mixtures are produced, where for example, crushed glass can be used as a substitute for sand additives, or improved thermal insulation properties can be achieved by mixing polystyrene and xps grinds. The concrete-based mix is fed into the concrete printing machine or concrete batching manipulator according to the production technology of the final product.

Case study: Improving manufacturing processes and manufacturing capacity for renewable energy products

The aim of the company, FHO Fémster LTD., with this project is to increase their own capacities due to the large industrial investments announced in recent years (Paks II ; modernisation of Máttra Power Plant ; construction of MOL Petrochemicals polyol plant) combined with the introduction of new types of modern technologies and, in addition to sustainable growth, to reduce their current energy consumption by 25% by 2030. In addition, they plan to expand capacity in product areas that will enable their large industrial customers to reduce their footprint. The complex investment project will improve both the manufacturing environment of the company and the production capacity of the renewable energy products (industrial water treatment equipment and rotating solar mounting systems). As part of the project, in addition to the acquisition of manufacturing technology and infrastructure investment, the company has also implemented a major renewable energy technology system. In addition, ICT investment will be made for the practical application of Industry 4.0 solutions. One of the biggest challenges is meeting the increased energy and drinking water needs of a rapidly growing society. The high-capacity, low-energy cavitation equipment they have developed over the last ten years is a solution to these problems. The process is environmentally friendly, economical to operate in the long term, and the investment can pay for itself within two to three years, with 0% CO₂ emissions. The generator has unique dynamics, can be connected to the pipework of existing heating systems and does not require costly modifications to be incorporated into the system. The water treatment plant performs the methane removal, and the captured hydrogen can be used. The development will provide the capacity to build the wastewater treatment plant and the rotating solar support structure system, which will be powered as far as possible by renewable energy. The production capacity to be developed will enable the company to produce both industrial wastewater treatment equipment and solar panel mounting systems. It will thus be linked to both the "Increasing water efficiency" theme and the "Strengthening domestic manufacturers serving energy efficiency improvements" strategic objectives.

Case study: Establishment of a solar panel assembly plant with needle-point galvanising to serve the domestic green economy

Establishment of a galvanising plant for domestic solar mounting structures at the site of Rinoker Solar Ltd. in Mikepércs. The development will include the construction of an 800 m² hall (architecture, engineering, electricity) and the installation of one of the most modern fire galvanising plants on the market, and a 500 kWp solar panel system will be installed on the site to provide 2/3 of the plant's electricity. Construction of an 800 m² hall to accommodate the hot-dip galvanising technology, a separate covered infrastructure is required, separate from other work processes, to house the technology and to be able to handle the completed solar support structures. The hall is designed as a 10x80 m lightweight hall, covered with an industrial floor and equipped with the necessary infrastructure for the technology - water, electricity, fire water reservoir and other safety and fire protection technology. The technology provides a complete solution for the galvanizing process to protect the produced elements/steel structures against corrosion. First, the crane structure is moulded in thin zinc, where the zinc is kept at a very high temperature, so that the immersed solar support structure starts to diffuse, creating a zinc patina on the surface, thus providing the steel structure with very long-term corrosion protection. The technology is much more efficient than painting and much more time resistant, so overall it is much more environmentally friendly, as a single intervention will extend the useful life of the structure for a very long time. Cost: HUF 950 million

Case study: Development of "ASZALMA" green and energy efficient building technology

The company (m20 ÉpítőK LTD) was established in 2018 with the aim of providing general construction services for residential and commercial properties in the Transdanubian region. The owners placed great emphasis on researching new technological processes, experimenting with modern materials and their use. In this project, the company intends to use straw, an agricultural by-product, to create an innovative building material with excellent thermal properties, and to develop a modular building technology. The aim is to use straw bales as a building material and as a self-supporting structural element. The company has previously constructed a sample pavilion using known technologies, which proved that both small, large and circular straw bales are suitable for self-supporting and load-bearing functions, i.e. the weight of the structural elements of the house and the loads on the building can be borne by the straw bale walls themselves. This system is anchored by a special steel mesh. From this experience, the company can create a so-called self-supporting straw house, a space with a communal function. The installation of the "straw" structures is easy, their structural design is stable and their function is flexible. The company's objective is to build with environmentally friendly technology, using as few unnatural materials as possible. In order to implement this project, it is necessary to acquire the tools that will enable the engineers to find solutions to develop building panels and slabs of the right size and density, and to define the technological requirements. It is not enough to buy the bales ready-made, the company has to be able to develop the right static elements by means of pressure and other mechanical tests. The project will cover the salary costs of 1 full-time architectural engineer, who will be responsible for the technical design of the new technological process. The project will also include the energy modernisation of the building: replacement of windows, heating and lighting systems, and the installation of a 15 kWp solar panel system for the building's operations.

Case study: Energy efficient wood pallet recycling system based on renewable energy system

The aim of the development is to recycle the wood pallets as raw material. In the recycling process, used pallets are broken into their components and the resulting wood of suitable quality is used to produce pallets, i.e. waste from the company's and other companies' activities is processed into finished products in their manufacturing operations. One of the technological pillars of the project is a custom-made used pallet dismantling line. The dismantling of used pallets requires a great deal of manual labour in the absence of suitable equipment, and is also hazardous due to the nails and wood damage. The automatic machine line dismantles the used pallets into suitable and reusable elements, from which the new pallet would be made. The machine is equipped with two dust extractors, so no harmful contamination is generated during processing. In order to meet all required standards, the pallets must be heat treated. Used pallets normally return for recycling with a high moisture content. This is problematic, as wet wood is not suitable for pallet production and can be contaminated with pests. A timber drying machine is required to eliminate this. In order to accommodate the new machinery, the company needs to carry out conversion work in the plant. To reduce the energy demand of the plant, the company aims to cover part of their energy consumption with a solar system. The nominal capacity of the planned solar panel system is 245,12 kWp. and is expected to save ~200.000 kW of electricity per year. The installation of the solar PV system will require an upgrading of the roof, according to a preliminary survey, 1 280 m² of roof surface will be required for the installation of the solar PV system, of which approximately 400 m² will need to be reinforced.

Summary of the economy of Heves County

Introduction

Heves County is located in the North-Hungary region²⁰, bordered by Nógrád, Borsod-Abaúj-Zemplén (BAZ), Jász-Nagykun-Szolnok and Pest counties. Although it does not border neighbouring countries, Heves County has an important role through its position in road and railway networks, and oil and gas transmission lines and energy supply lines. The county covers an area of 3,637 km² and has its administrative centre in Eger.

Population and income levels

The population of Heves County has been in steady decline, falling from 328,000 in 2001 to 290,000 in 2022, corresponding to fall in its share of the national population from 3.2% to 3.0% (Figure 6). Medium-term projections indicate further population decline is expected, except in a few municipalities in the south of the county.

Between 2001 and 2012, the county's share of national GDP fell from 2.4% to 2.0%, after which it recovered slightly but fell again in 2020-2021, to stand at 2.2% in 2021 (Figure 7). An outcome of the difference between Heves County's contribution to national GDP and its population share is that GDP per capita in Heves County is under three quarters of the national average. The Heves situation is similar to Borsod-Abaúj-Zemplén (BAZ) but well above Nógrád, which has the lowest level of GDP per capita in Hungary at about 45% of the national average (Figure 8).

Economic structure and performance

The Heves economy is heavily centred around manufacturing, which accounted for 35% of the county's gross value added in 2021, well above the national average of 20% but below Borsod-Abaúj-Zemplén that has a share of 39% (Figure 9). The share of manufacturing in the economy of Heves County has increased substantially, from 23% in 2009, while at the same time there has been a decline in 'Mining, Energy, and Water & Waste', which has fallen from 12.6% in 2009 to 5.7% in 2021 (Figure 10). After the the change of regime, the expansion of the manufacturing sector became a key driver of economic development in rural areas of Hungary, although the counties of Heves and Borsod-Abaúj-Zemplén were relative latecomers to the 'industrial boom' phenomenon compared to the areas of North Transdanubia.

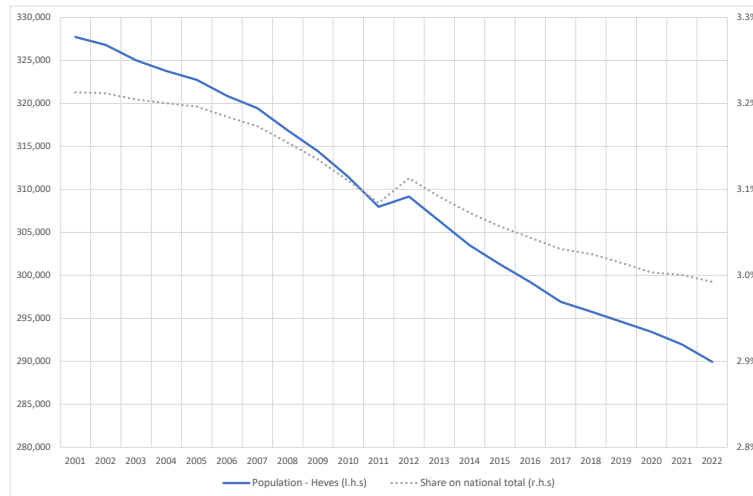
Figure 5 Counties of North Hungary Region and districts of Heves County



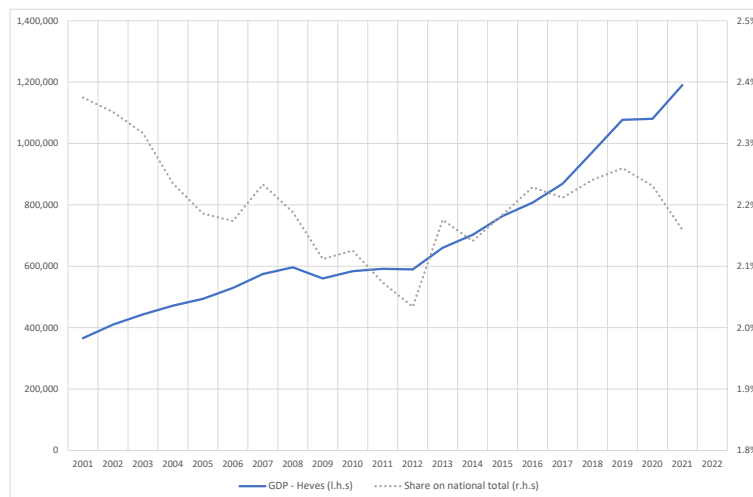
Source: adapted from Wikipedia²¹

20. The NUTS2 region of Northern Hungary (Észak-Magyarország) is composed of 3 counties: Heves, Nógrád, and Borsod-Abaúj-Zemplén.

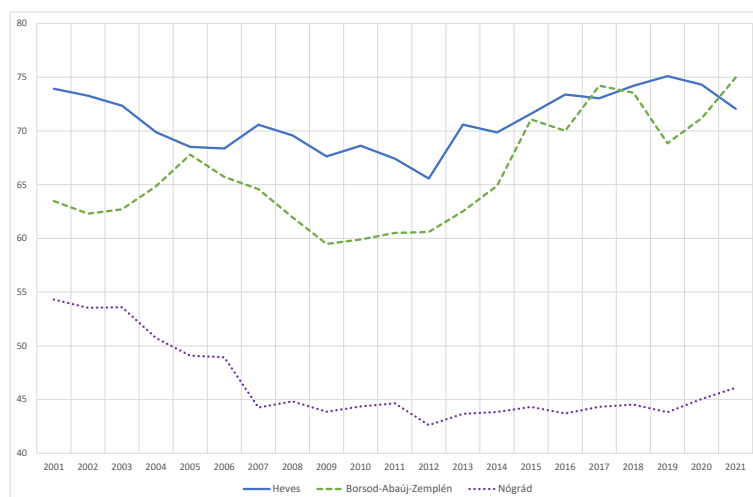
21. Based on Peyer at Hungarian Wikipedia, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=38596069> and Mikovari - Own work, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=29240796>

Figure 6: Population of Heves County (number, 2001-2022)

Source: authors calculations based on KSH (nep0034)

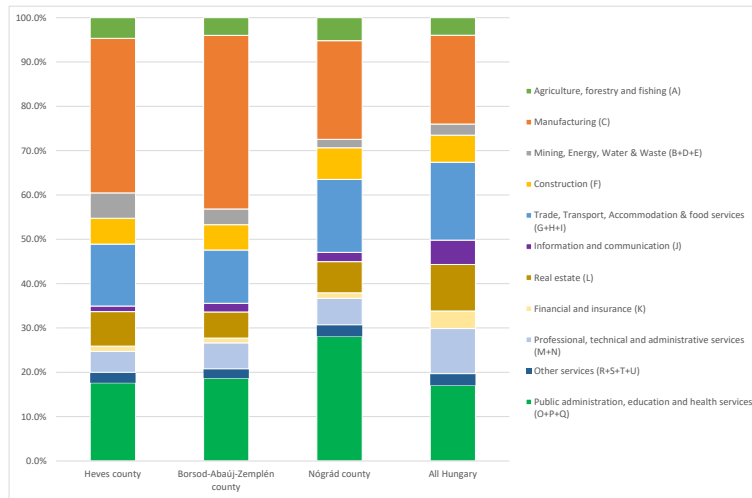
Figure 7: Gross Domestic Product of Heves County (million HUF, 2001-2021)

Source: authors calculations based on KSH (gdp0077)

Figure 8: Gross Domestic Product per capita as a percentage of national average (% , 2001-2021)

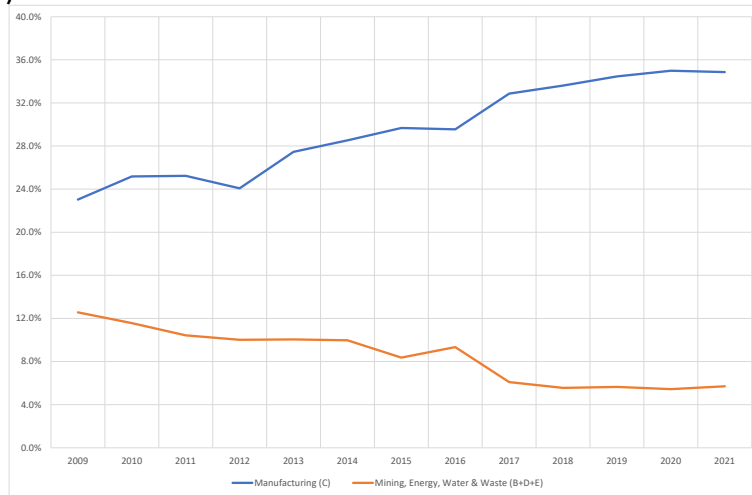
Source: KSH (gdp0078)

Figure 9: Breakdown of gross value added by sector – NACE Rev 2.1 (% 2021)



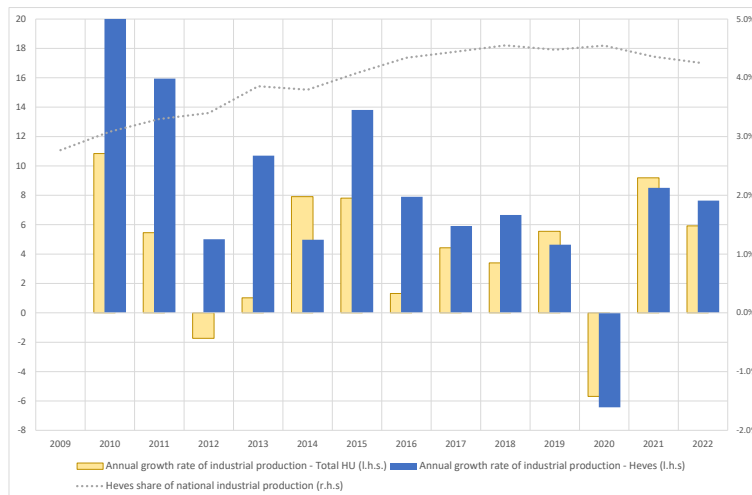
Source: authors calculations based on KSH (GPKC04_W)

Figure 10: Share of ‘Manufacturing’ and ‘Mining, energy, water and waste’ in total gross value added of Heves County (% 2009-2021)



Source: authors calculations based on KSH (GPKC04_W)

Figure 11: Growth rate of industrial production (% change year on year, 2010-2022)



Source: authors calculations based on KSH (ipa0020)

Growth in the volume of industrial production in Heves County has regularly outstripped that of the national economy as a whole, resulting in the County's share of the value of total national industrial production increasing from 2.8% in 2009 to 4.5% in 2019, although it fell to 4.2% in 2022 (Figure 11). Data for the first quarter of 2023²² indicates that industrial production (HUF 631 billion) of Heves County represented 4.6% of the national output. Output per capita was more than one and a half times the national average, placing the County in the top half of the regional ranking.

Manufacturing also dominates business investment in Heves County. According to the situation analysis prepared in connection with the development of the North-Eastern Hungary Economic Development Zone 2020²³, manufacturing accounted for 60% of business investment in Heves County in 2019. A further 7.8% of investment funds were used in the energy sector and 6.9% in transport and storage. Within manufacturing, the highest levels of investment were in electronics, transport equipment and foodstuffs.

Data for the first quarter of 2023²⁴ indicates that industrial enterprises accounted for 65% of the value of business investments in Heves County. Overall, business organisations with headquarters in Heves County accounted for 1.4% of the value of total national business investment (i.e., HUF 31 billion). Enterprises with at least 250 employees accounted for 43% of the investment value, slightly above the national share (42%). Manufacturing accounted for nearly half (49%) of business investment in Heves County, notably in the sectors of electronics, metalworking, metallurgy, transport and food. Other important investment sectors were transport, storage and energy.

District-level performance within Heves County

Within Heves County, the most dynamically developing economic area is located within the so-called Hatvan-Gyöngyös-Eger 'economic axis'. This is where the export-oriented multinational and Hungarian companies have settled. It also includes the Mátra Power Plant Zrt, which remains the largest employer in the County. These three districts are home to 16 out of the 21 large enterprises with more than 250 employees in Heves County, with 8 large enterprises in the Eger district, 6 in the Gyöngyös district and 4 in the Hatvan district.²⁵

22. Source: Hungarian Central Statistical Office, <https://www.ksh.hu/docs/hun/xftp/megy/231/heve231.xlsx>

23. Source: https://www.uni-miskolc.hu/files/11814/H_1206.pdf

24. Source: Hungarian Central Statistical Office, <https://www.ksh.hu/docs/hun/xftp/megy/231/heve231.xlsx>

25. Source: TEIR database (2022).

Enterprise development in Heves County with special regard to the district of Gyöngyös

- **Apollo Tyres**, is one of the 20 largest tyre manufacturers in the world, with 7 production centres in India and the Netherlands. The plant in Gyöngyöshalász has an annual production capacity of more than 5.5 million tyres for passenger cars and 675,000 for buses and trucks. The company is a key player in the regional labour market and already employed 877 people in 2019.
- **B. Braun Medical (Hungary) Ltd.**, is one of the leading players in the healthcare market in Hungary. The company increased its workforce from 1,198 to 1,558 between 2017 and 2019 thanks to a HUF 30.7 billion factory expansion.
- **Baumit Ltd.**, is a leading manufacturer of building materials, focusing on the production of quality materials for building renovations. The company had net sales of HUF 42.6 billion in 2022. The company is located in the industrial park of the Mátra Power Plant and produces FGD gypsum - an important binder material - as a by-product of the flue gas desulphurisation process at the Mátra Power Plant
- **GEOSOL Zrt.**, is located in the Industrial Park of the Mátra Power Plant and produces alternative fuels, recycled raw materials and biomass for energy purposes. Its main task is to serve the wide range of alternative fuel needs of Mátra Power Plant. The company is a direct subsidiary of MVM. GEOSOL's net sales of HUF 8 billion generated a profit of more than HUF 2.1 billion in 2022. In 2023, the company obtained an environmental permit to set up a composting plant in Bükkábrány, where it plans to produce compost from non-hazardous waste, which will be used for the recultivation of the abandoned part of the Bükkábrány mine.
- **Giant Hungary Kft.**, has set up a bicycle manufacturing plant in the Gyöngyös Industrial Park that will, when the two investment phases are completed, provide jobs for a total of 712 people (105 office workers and 607 manual workers).
- **Masterplast Plc.**, is building a rock wool factory on a 10 hectare site in the village of Halmajugra, leased from the Mátra Power Plant, which will have an annual production capacity of 35,000 tonnes and will provide employment for 150 workers.
- **Procter & Gamble**, originally set up a factory in Gyöngyös to produce diapers, but has since moved on to manufacture electric toothbrushes, electric razors and women's epilators. The number of employees at the site has exceeded 500.
- **Robert Bosch Automotive Steering Ltd.**, is an automotive supplier of steering gears, steering columns, steering shafts and remanufactured parts to more than 100 vehicle manufacturers. In Heves County, the company also operates sites in Eger, Maklár and Hatvan, making it one of the largest employers in the region. The company currently employs around 1,700 people and in 2022 it achieved a turnover of HUF 295 billion, 37 % more than in the previous year. By 2024, a new production and logistics area will be built at the Bosch factory in Maklár, at a cost of HUF 52 billion. In the industrial park in Hatvan, the company has built the third largest warehouse centre in Europe, which provides packaging and warehousing services for the company's Hungarian and regional factories.
- **Saint-Gobain Hungary Kft.**, is a leading company in the construction industry, selling insulation, plasterboard, pipes, windscreens, building glass, in addition to its construction systems and solutions. It also operates a plasterboard factory in Halmajugra, in the industrial park of the Mátra Power Plant. The raw material used for production is gypsum material produced from a by-product of MVM Mátra Energia Zrt. Profit before tax fell from HUF 1.918 billion to HUF 1.118 billion in 2021 and further decreased to HUF 0.574 billion in 2022. The decrease was mainly caused by the increase in raw material prices and energy prices. The increase in raw material prices is also partly due to the increase in energy prices and shortages of some raw materials.
- **Schneider Electric Hungária Zrt.**, operates a factory in Gyöngyös that plays a special role in the global production of power strips for the company, which is a world leader in the digitalisation of energy management and industrial automation solutions. In December 2020 it announced that (with state support) it would expand the factory and had already increased its workforce to 210.
- **ZF Hungária Zrt.**, based in Eger, manufactures and sells manual, automated and automatic transmissions and their components, employing an average of 1,700 people per year. The company's customers mainly install the components in trucks, buses, small commercial vehicles, and passenger cars.

The economic dominance of the three districts making-up the Hatvan-Gyöngyös-Eger 'economic axis' is reflected in the number of enterprises and employment levels ([Table 1](#)) and business performance ([Table 2](#)). Jointly, the three districts account for 85% of business sector²⁶ employment in Heves County, with business employment accounting for nearly half (48%) of all employment in Hatvan district and 45% in Eger district ([Table 1](#)). These three districts also have the highest level of capital intensity (measured by fixed assets per employee), especially Gyöngyös district that has an average capital intensity of HUF 34.7 million per employee, presumably due in part to the Mátra Power

Plant, and which is nearly 60% higher than for Heves County as a whole. Average business sector salaries in these three districts are also significantly higher than in the other districts, notably in Hatvan district where average salary costs are 24% higher than the County average and more than twice the levels of Bélapátfalva district and Heves District. Although some caution is needed when looking at individual year outcomes, we can also see that average pre-tax profits per employee are typically higher in these three districts, with Hatvan district once again standing out as having the highest profits per employee, although Füzesabony district has the second highest calculated level of pre-tax profits per employee.

26. Business sector is hereby based on data from entities covered by the National Tax and Customs Administration Corporate Tax database of corporate tax profit and loss accounts.

Table 1: Businesses and employment by district in 2021

	Total employment ¹		Number of businesses ²	Business employment ³		Share of business sector employment in total employment in the district
	Number of employees	District share of employees in the county	Business submitting a tax return	Ave. number of business sector employees	District share of business sector employees in the county	
Hatvan district	23,620	18%	1,050	11,395	25%	48%
Gyöngyös district	30,206	24%	1,699	10,291	23%	34%
Eger district	35,910	28%	2,724	16,199	36%	45%
Füzesabony district	12,649	10%	472	2,876	6%	23%
Pétervására district	7,913	6%	346	1,683	4%	21%
Heves district	14,110	11%	466	2,257	5%	16%
Bélapátfalva district	3,671	3%	158	510	1%	14%
Heves County	128,079	100%	6,915	45,211	100%	35%

Notes:

1. Total number of employees (Hungarian State Treasury (MÁK))
2. Businesses submitting a tax return (National Tax and Customs Office (NAV) Corporate tax database)
3. Total number of employees (National Tax and Customs Office (NAV) Corporate tax database)

Source: authors calculations based National Regional Development and Spatial Planning Information System ("TEIR")

Table 2: Business performance indicators by district in 2021

	Average fixed assets ¹ per employee		Average salary cost ² per employee		Average pre-tax profit ³ per employee	
	HUF 1,000	District as a share of county average	HUF 1,000	District as a share of county average	HUF 1,000	District as a share of county average
Hatvan district	20,400	93%	5,790	124%	4,040	148%
Gyöngyös district	34,700	158%	4,700	101%	2,520	92%
Eger district	18,600	85%	4,580	98%	2,230	82%
Füzesabony district	12,900	59%	3,120	67%	3,020	111%
Pétervására district	16,200	74%	3,450	74%	1,290	47%
Heves district	12,100	55%	2,830	61%	1,630	60%
Bélapátfalva district	14,900	68%	2,630	56%	1,990	73%
Heves County	21,900	100%	4,670	100%	2,730	100%

Notes:

1. Fixed assets - calculated from TAO income statement; taxpayers according to Hungarian accounting rules (National Tax and Customs Office (NAV) Corporate tax database)
2. Salary expenses - calculated from TAO income statement; taxpayers according to Hungarian accounting rules (National Tax and Customs Office (NAV) Corporate tax database)
3. Pre-tax profit - TAO; taxpayers according to Hungarian accounting rules (National Tax and Customs Office (NAV) Corporate tax database)

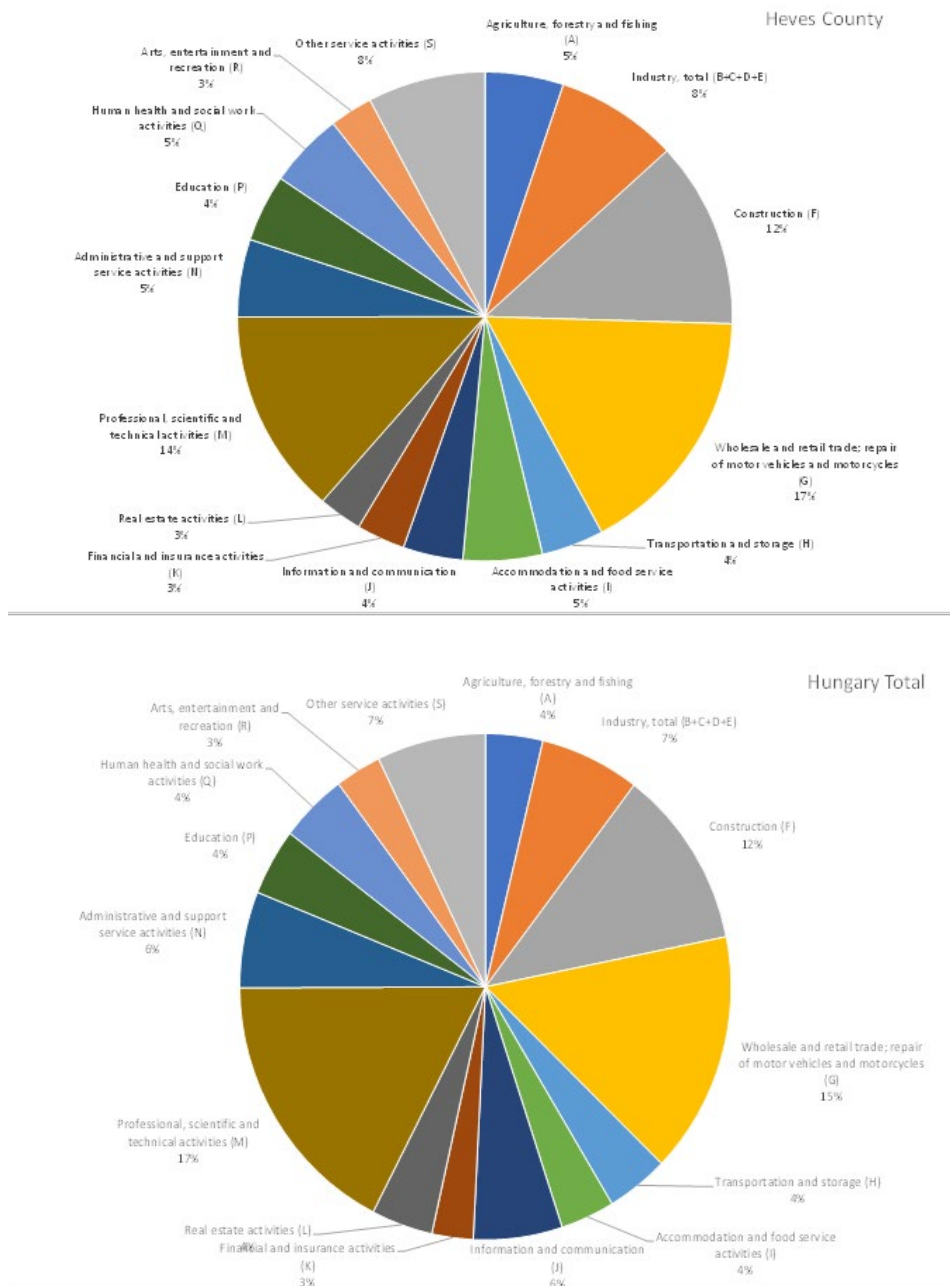
Source: authors calculations based National Regional Development and Spatial Planning Information System ("TEIR")

Enterprise structure and performance

The distribution of active enterprises by sector indicates that, compared to the overall national distribution in 2020, Heves County has a relatively high proportion of enterprises in the sectors of ‘Accommodation and food service activities (I)’, ‘Industry (B+C+D+E)’, ‘Agriculture, forestry and fishing (A)’ and ‘Wholesale and retail trade; repair of motor vehicles and motorcycles (G)’ but lags behind in terms of the share of enterprises in the sectors of ‘Professional, scientific and technical activities (M)’, ‘Information and communication (J)’ and ‘Administrative and support service activities (N)’ (Figure 12). Overall, this suggests the Heves economy has a relatively high proportion of enterprises in ‘traditional’ sectors of agriculture, industry, retail, and accommodation but may be weak in terms of professional and other business services.

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Figure 12: Breakdown of number of enterprises by sector – NACE Rev 2.1, (% of total, excluding Public Administration and Social Security(O), 2020)

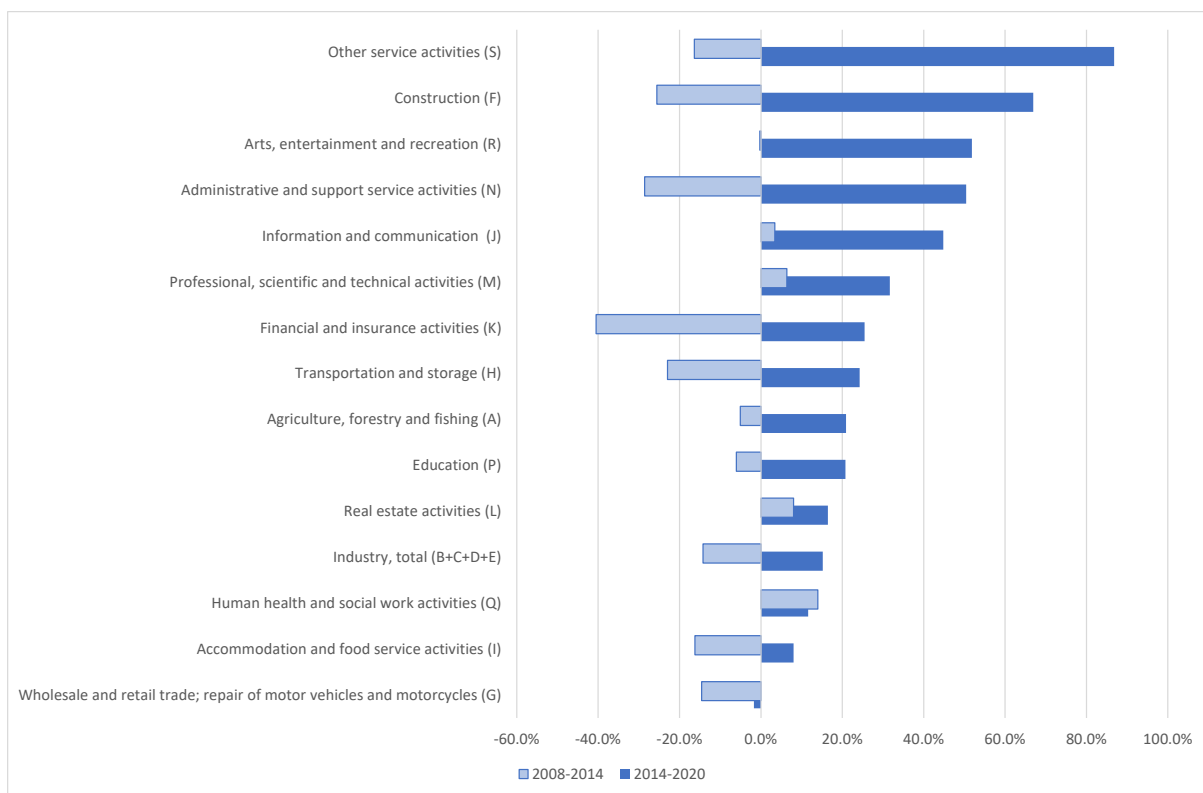


Source: authors calculations based on KSH (gsz0075)

Data on the growth in the numbers of active enterprises points, however, to some rebalancing of the economy towards the national structure. In terms of overall numbers, the general picture shows a contraction of the number of enterprises between 2008 and 2013/14, followed by an increase from 2015 to 2020.²⁷ The sectors with the fastest growing number of enterprises over recent years appear to be ‘Other service activities (S)’, ‘Construction (F)’, ‘Arts, entertainment and recreation (R)’, whereas ‘Industry (B+C+D+E)’, ‘Accommodation and

food services (I)’ and ‘Wholesale and retail trade (G)’ have had the least growth in enterprise numbers (Figure 13). Looking within ‘Industry’, data from the TEIR database, indicate that between 2016 and 2021 the number of registered enterprises in ‘Electricity, gas, steam supply, air conditioning’ in Heves County grew from 16 to 43, whilst ‘Water supply, sewerage, waste management and remediation activities’ and ‘Mining and quarrying’ both saw declines in the number of enterprises (Table 3).

Figure 13: Growth in number of enterprises in Heves County by sector – NACE Rev 2.1 (% change in number of enterprises 2008-14, 2014-2020)



Source: authors calculations based on KSH (gsz0075)

Table 3: Growth in number of enterprises in Heves County within the Industry sector

	Total employment ¹		% Change
	2016	2021	
Electricity, gas, steam supply, air conditioning	16	43	168.8%
Manufacturing industry	2,144	2,224	3.7%
Water supply, wastewater collection, treatment, waste management, decontamination	67	59	-11.9%
Mining, quarrying	19	16	-15.8%

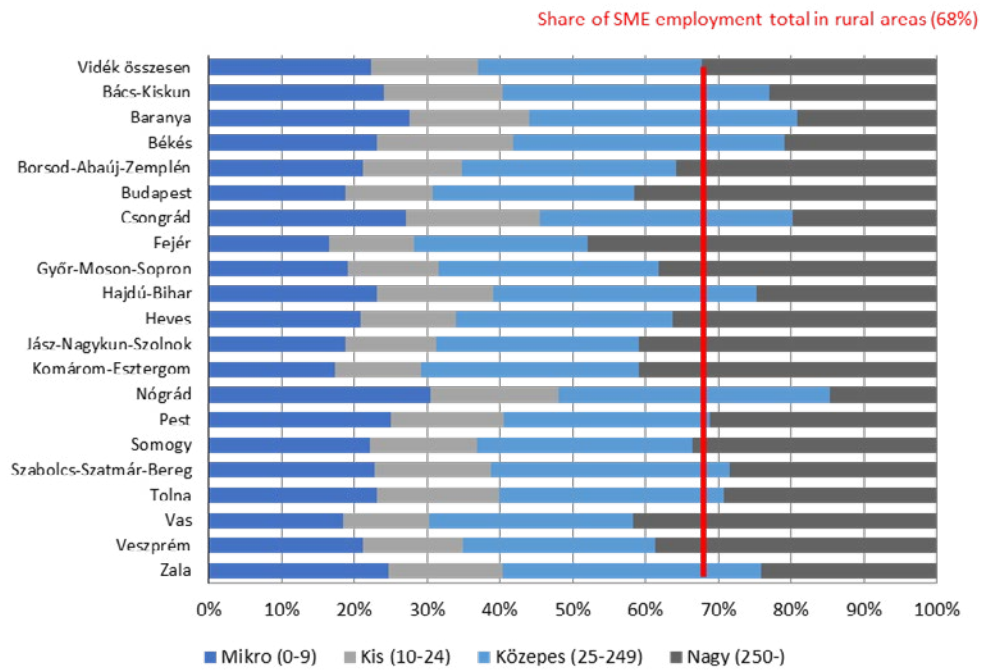
Source: authors calculations based National Regional Development and Spatial Planning Information System (“TEIR”)²⁷

27. Data are available for 2021 but appear to not be comparable with earlier years due to a change in methodology, which expanded the data sources through the inclusion of social security records from the National Customs and Tax Authority.

The share of larger enterprises in total employment in Heves is slightly above the average for all Hungarian rural areas (Figure 14) but, more strikingly, larger enterprises account for a significantly higher proportion of net turnover in Heves County

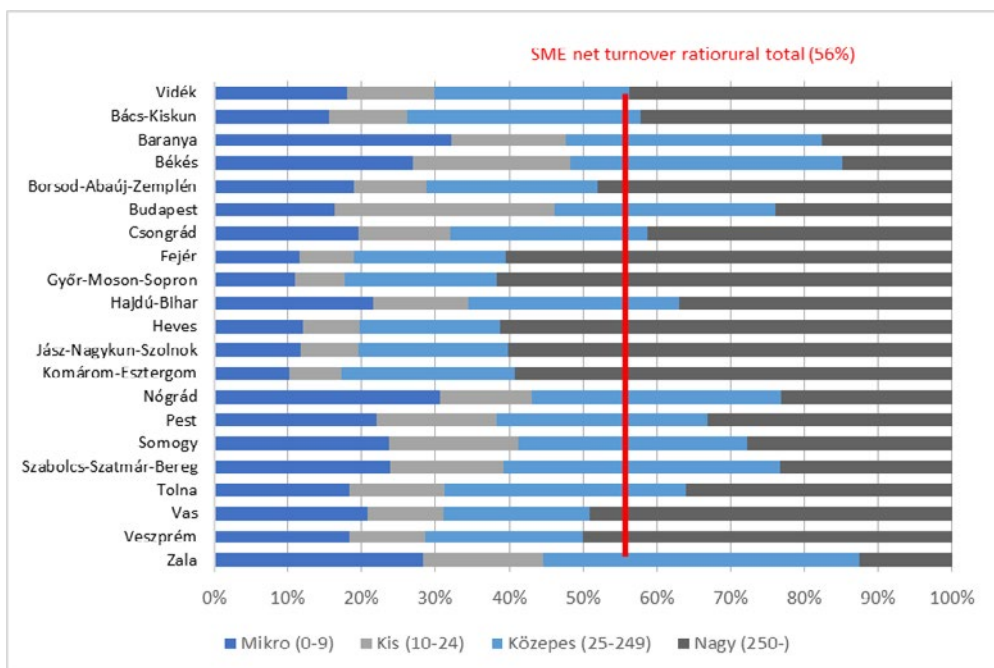
(61.2% as compared to a rural average of 43.8%) or, conversely, the share of SMEs is substantially below (17.5 percentage points lower) the Hungarian rural average (Figure 15).

Figure 14: Distribution of employment by size of enterprise, by county (% of total employment, 2020)



Source: OPTEN database (2020)

Figure 15: Distribution of turnover by size of enterprise, for rural counties (% of total turnover, 2020)



Source: OPTEN database (2020)

Labour market

Alongside the overall decline in population, which fell by 6.7% between 2009 and 2022, there has been an even more rapid decline in the size of the working age population (15-64), which fell by 13.7%. The evolution of the employment rate in Heves County has largely followed that at the national level, although remaining persistently below the national rate. The employment rate of the 15-64 age group in Heves County increased by more than 15 percentage points between mid-2013 (55%) and the first half of 2023 (72%) (Figure 16). In parallel, the corresponding unemployment rate in Heves fell from a peak of 14.6% in 2012 to less than 3% in 2019, and subsequently has mostly remained in a range between 3% to 4%. (Figure 17). New investments have pushed up the number of job vacancies in Heves, which steadily increased from 2009 to peak at over 1,500 in 2018, before falling in 2019 and 2020, and rebounding in 2021; this pattern of the development of vacancies in Heves County broadly follows the evolution at the national level (Figure 18).

The breakdown of the employed by economic sector based on the 2016 micro-census shows that more than half of the employed in Heves County work in four sectors: 'Manufacturing' (26.48%), 'Trade and repair of motor vehicles' (10.65%), 'Public administration, defence and compulsory social security' (11.46%) and 'Education' (7.80%). Compared to the national figures, the manufacturing sector in the County employs more people than the national average (19.64 %). There was no observed significant change in the distribution of employment by sector compared to 2011.

The Heves County Development and Training Committee regularly assesses labour market expectations. According to their findings, there is currently a labour shortage in Heves County in the order of several thousand. Occupations with a notable shortage of workers include: tyre maker, car mechanic, car manufacturer, confectioner, machinist, machining technician, industrial machinist, carpenter, mason, mechatronics technician, agricultural machinist, building construction technician, social care and nursing, electrician, welder, central heating and gas system installer, cook, nurse practitioner, infant and child care practitioner, forestry technician, IT technician, baker, mine technician, carpenter, mechatronics maintenance technician

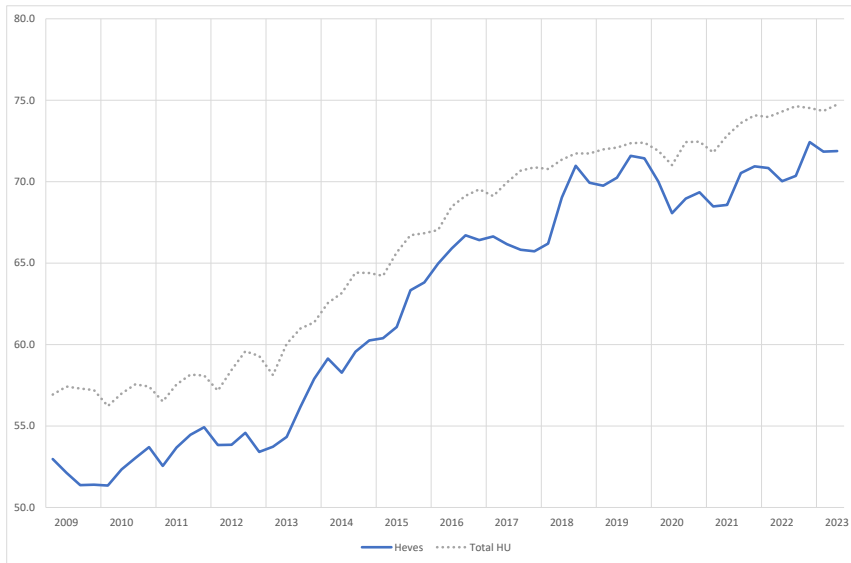
Research & Development and Innovation performance

The Northern Hungary region, which includes Heves County, performs moderately in terms of R&D and innovation. Its overall innovation performance index is below 60% of the EU average placing it in 214th position out of 234 EU regions, and it is the worst performing among Hungarian regions for the 'Innovation Pillar' (Table 4).

In Heves County, R&D expenditure amounted to only 0.59% of GDP in 2020, just over half the national average. Similarly, the share of R&D personnel as a percentage of the active population only 0.57%, less than half the Hungarian national average (Figure 19).

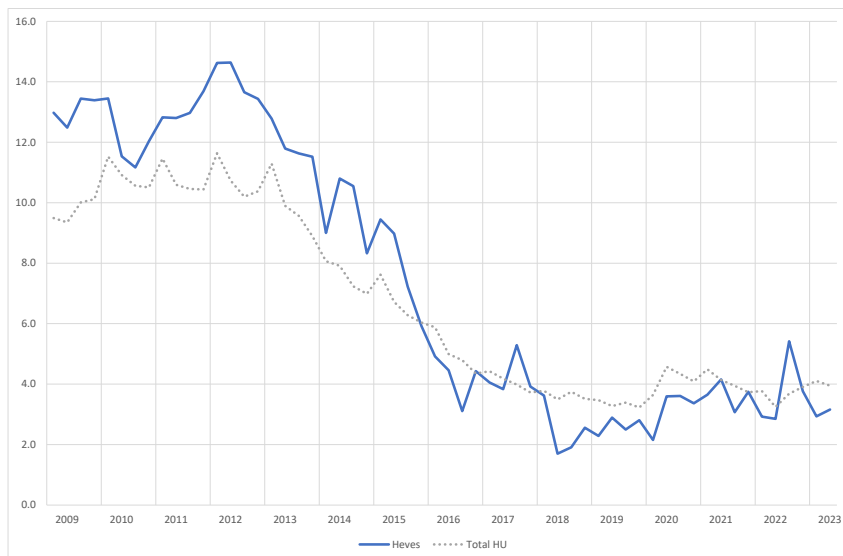
Researchers and academics are concentrated in a few scientific centres and corporate research departments, with minimal apparent spillovers from research activities into the wider economy. A few university research centres and knowledge clusters in the Northern Hungary region are seeking to develop foreign-owned and domestic business partnerships. The University of Miskolc stands out in terms of the number and importance of industrial partners, while other higher education institutions such as the Károly Róbert Campus of MATE in Gyöngyös have also developed partnerships with the business sector, mainly in agriculture, food and tourism. An important regional research actor is the Bay Zoltán Foundation for Applied Research. The main profile of the Eszterházy Károly Catholic University in Eger is higher teacher training, based on a tradition of several decades. Another important regional research actor is the Bay Zoltán Nonprofit Ltd. for Applied Research that provides services in innovation and technology transfer in cooperation with Hungarian and foreign partner institutions.

Figure 16: Employment rate (% share of the population aged 15–64, 2009-2023 Q2)

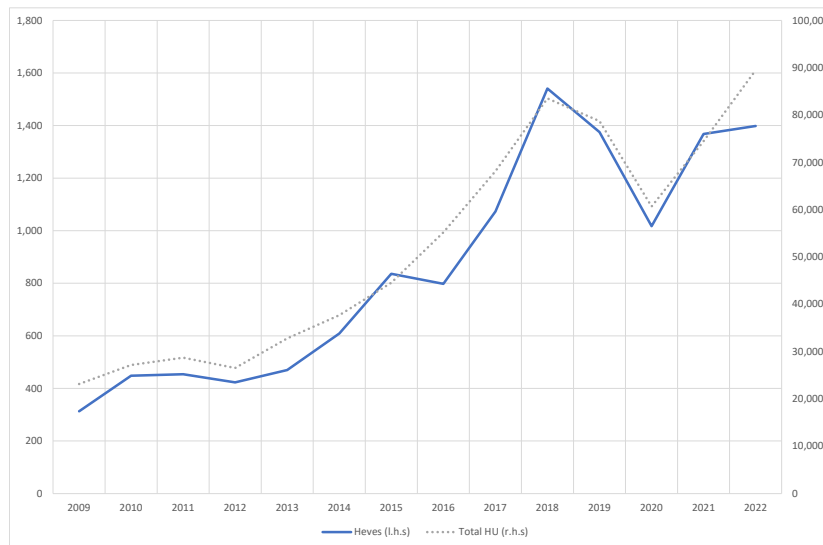


Source: KSH (mun0162)

Figure 17: Unemployment rate (% share of the active population aged 15–64, 2009-2023 Q2)



Source: KSH (mun0162)

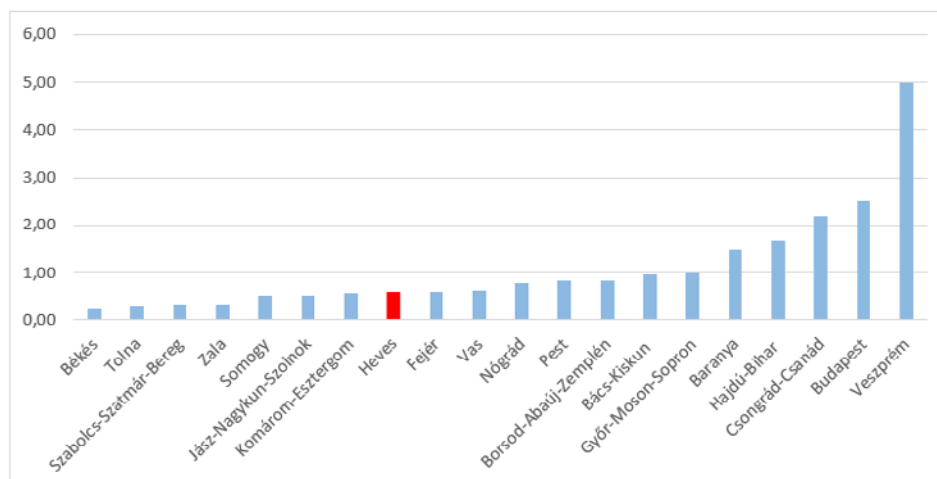
Figure 18: Number of vacancies by location, (number, 2009-2022)

Source: KSH (mun0091)

Table 4: Innovation performance indicators for Hungarian regions

	Innovation Sub-Index		Technological readiness Pillar		Business sophistication Pillar		Innovation Pillar	
	Score	Ranking	Score	Ranking	Score	Ranking	Score	Ranking
Northern Great Plain	55.5	219	79.4	180	34.1	212	46.7	208
Southern Great Plain	56.7	215	78.3	182	38.3	207	47.8	204
Northern Hungary	56.8	214	81.1	174	37.6	209	45.3	212
South Transdanubia	60.7	204	82.2	172	41.7	203	52.5	194
Central Transdanubia	62.0	200	91.1	150	35.1	211	52.3	195
Western Transdanubia	64.1	197	85.2	164	40.2	205	61.8	178
Budapest and its commuting zone	107.6	85	103.7	106	100.6	111	120.3	48
Rank out of 234 regions								

Source: EU Regional Competitiveness Index (2022 edition)

Figure 19: R&D expenditure as a percentage of GDP by county in 2020

Source: KSH (tte0022)

Connectivity and mobility

Although not directly bordering neighbouring countries, Heves County plays an important role in international connectivity and at national level in the linear infrastructure systems, including the road network, the rail network, the hydrocarbon transmission pipelines and energy supply pipelines. It is part of the European transport network, as the Trans-European Transport Network (TEN-T) Corridor V passes through the County.

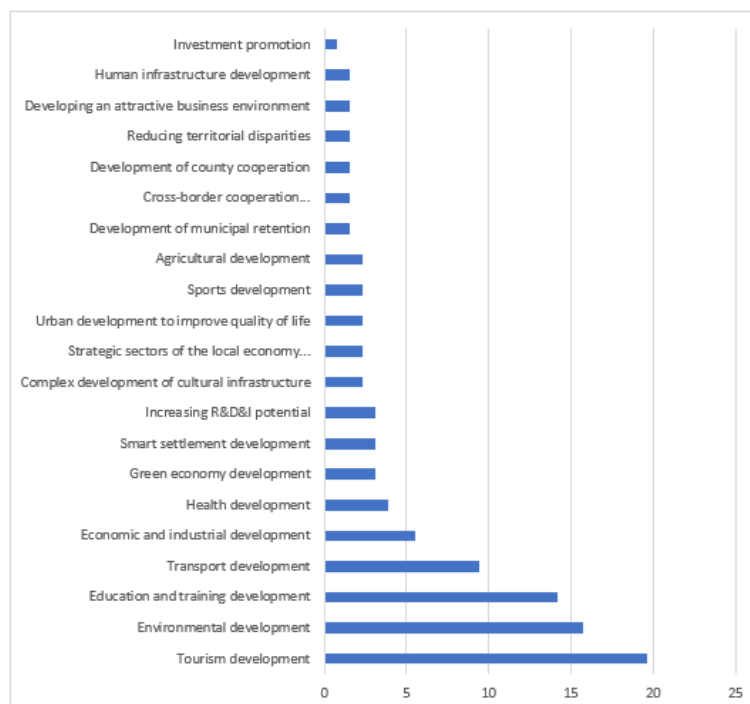
The economy of Heves County is integrated both into the national and regional economic fabric. At the regional level, the local economies of other (especially neighbouring) counties are linked to the value chains of companies operating in Heves County. Furthermore, due to commuting patterns, the Heves County labour market spills over to other counties and is not clearly defined at the county border.

The proportion of commuters is highest on the Hatvan-Gyöngyös-Eger axis, reflecting the ease of access to jobs in larger cities from smaller municipalities within the district. According to the 2011 census data²⁸, a total of 114 329 people commuted daily in Heves County, of whom 83 541 commuted daily in the Hatvan-Gyöngyös-Eger districts. For the other districts, the workforce is less mobile, one reason for this may be the more difficult access to the County capital and the distance to motorway interchanges.

Economic development strategy

According to the Heves County's Strategy to 2030 (prepared as part of the North-Eastern Hungary Economic Development Zone 2030), the key sectors in the County are automotive and mechanical engineering, electronics, IT, trade and energy. Emerging sectors include food, chemicals, plastics and rubber, non-materials and other sectors. Investment in these sectors is also increasing significantly. Among the developing sectors, the importance of tourism should be highlighted, which has been on a steadily developing path in recent years. As part of the accompanying analysis of the situation in Heves County, development ideas proposed by the County's economic actors were ranked according to intervention area (Figure 20); in addition to tourism development, other frequently indicated areas include agricultural development, education and training development, and also transport and industrial development. Furthermore, transformation of the Matra coal region is a factor influencing proposed interventions.

Figure 20: Share of interventions proposed by economic operators by intervention area (% of total project proposals)²⁸



Source: Heves County Strategy up to 2030, prepared for for the preparation of the 2030 Strategy for the North-Eastern Hungary Economic Development Zone

28. KSH: https://www.ksh.hu/docs/hun/xftp/idoszaki/nepsz2011/nepsz_18_2011.pdf

The Strategy aims to make Heves County an investment destination with a renewed environmental infrastructure, a sustainable economic structure and a resilient local society by 2030. This will be made possible by economic objectives based on development needs, including in particular the expansion of the function and capacity of tourism, the greening of the economy, innovative agricultural development, environmentally friendly investments in water management, the improvement of the quality of life in the County, and the modernisation of education and training infrastructures necessary for sustainable social and economic development.

Economic and industrial development interventions within the Strategy are linked to the development and expansion of County industrial parks and the modernisation of SMEs (Industry 4.0). The industrial districts of Gyöngyös, Füzesabony, Pétervására, Béalápátfalva and smaller agglomerations can undergo significant development because of the strong economic development incentives of the zone strategy, thus

creating a more attractive investment environment for the businesses that locate there. This will require a significant increase in infrastructure capacity (e.g., upgrading the electricity network). Interventions related to education and training development aim to increase the human and basic infrastructure and capacity of higher education and public education, building on the existing school and training centres that cover 75% of the shortage occupations that have been identified in the County.

In the context of the development of the green economy, the Strategy is mainly directed towards setting-up of small-scale renewable energy (solar, geothermal) power plants at regional and municipal level to meet domestic and public energy needs, to reduce CO₂ emissions from electricity and heat production. In addition, in the context of the green economy, the Strategy also highlights the horticultural use of thermal energy for sustainable energy management in the production of greenhouse vegetables.

Linkages to the green and circular economy

Battery industry. According to the National Battery Industry Strategy 2030, sustainable batteries will play a key role in meeting growing electricity consumption needs. The strategy highlights electromobility as a target sector and the important role of batteries in electricity supply through their short-term storage function. The strategy highlights the vulnerability of global value chains and notes that the need for more resilient value chains has prioritised the development of domestic battery value chains. Involvement in the automotive value chain is important for the economy of Hungary and Heves County and, therefore, involvement in the battery industry value chain is considered an important opportunity.²⁹

Solar parks. Heves and BAZ counties have seen the establishment of several solar parks in recent years. The first in a series of investments was the 16MW solar power plant built in 2015, two kilometres from Visonta. This was followed by the construction of several more large-scale solar power plants (Heves: Visonta 16MW, Halmajugra 20MW; BAZ: Bükkábrány 22,6MW, Mezőcsát 233MW, Felsőzsolca 20MW). This is a value chain to which the region's economy can connect at several points.

Green Bus Programme. As a first step of the Green Bus Programme, the Green Bus Model Project has been launched to introduce electric buses for local transport trials in rural cities, to gather experience in vehicle procurement and use, and to develop and charge infrastructure. In the Green Bus Programme's pilot project, a new electric bus has been tested at the Mátra Power Plant and its region, where a bus has been put into operation on an experimental basis to transport workers. The Green Bus Programme will also require a charging network and other related investments, in which the region can be involved.

Towards a National Circular Economy Strategy for Hungary. The Circular Economy Strategy, prepared in the first half of 2023, identified three economies as having the potential to strengthen the circular economy. These are the biomass sector, the construction industry and the plastics industry. The Mátra Power Plant, which operates in the region, has the largest biomass product chain in the country, using around 350,000 tonnes of biomass per year

29. Source: <https://kormany.hu/dokumentumtar/nemzeti-akkumulator-iparagi-strategia-2030>

SWOT Analysis

The preceding analysis has outlined the economic situation and performance of Heves County. Drawing on these findings, the following table provides a summary SWOT (Strengths, Weakness, Opportunities and Threats) analysis.

Strengths

- A strong industrial tradition in the County.
- The region moves the most biomass fuel in the country, with MERT using 350,000 tonnes of biomass annually. This means existing, well-established logistical routes, connections, suppliers, etc.
- A number of government-supported solar power developments have started in the region.
- University training centres with local connections.
- Energy and agriculture research capacity at MATE campus.
- Vocational training portfolio covering most of the shortage occupations.
- The Mátra has traditionally been of outstanding importance for tourism and is rich in opportunities.

Weaknesses

- Traditional employment structure with regionally concentrated employment in declining industries around Gyöngyös (Mátra Power Plant and its value chain).
- While a significant part of economic activity is concentrated in the MERT industrial park, cooperation between businesses is not strong.
- R&D expenditure in the County is only half the rural average. Low share of innovative activities in carbon intensive sectors.
- Low level of entrepreneurial spirit, as indicated by the low number of active companies per 1 000 inhabitants (58 active companies per 1 000 inhabitants in Heves County).
- No business incubation centre in the region.
- Lack of knowledge of green economy and circular economy
- The majority of miners do not want to move from their current jobs, due to their current high wages compared to the region.
- Transport is also a major pollutant in the region – low per capita income and limited opportunities for local actors make it difficult to address.

Opportunities

- The important infrastructures of MERT, such as rail freight, large industrial water supply or electricity grid connection
- The 400 kV cross-border transmission line between Sajóivánka (HU) and Rimaszombat (SK) substations will have a positive impact on the Northern Hungary region.
- Cooperation with the relevant public authorities, especially HIPA and PM, to attract new job-creating investments to the region.
- Industrial park already in operation (next to MERT), with some existing concepts towards greening the economy (e.g. production of efficient insulation materials).
- The County has a wealth of thermal resources, and there are considerable advantages to be gained from using water resources with a temperature of 30-35 °C and converting them into thermal energy.
- The role of solar energy in electricity generation in the County is less significant than elsewhere, although the County's natural conditions are favourable in this respect - the number of hours of sunshine in the County is above the average for Hungarian counties, which provides a strong basis for the expansion of solar parks or the construction of additional facilities.
- Link to the battery manufacturing value chain
- Link to ancillary investments required by the Green Bus Programme (e.g., charging station, etc.)
- Encourage cooperation between industry and higher education to strengthen R&D and innovation activities.
- Encourage business start-ups through training, soft actions (e.g., advisory and consultancy services).
- With the closure of lignite mining, there are significant re-cultivation tasks that could provide employment for a significant number of people for many years to come. This will provide opportunities for development in the fields of recreation, tourism, agriculture and the presentation of cultural heritage.

Threats

- Inadequately coordinated actions to address problems related to the implementation of the transition. No clear coal phase-out schedule.
 - The investments planned in MERT cannot take place without EU funding.
 - Nearly 2 700 people in the County work in ETS facilities that are at increased risk of transition and are not informed about it.
 - Transition of the Mátra power plant may pose a threat as many businesses in the industrial park are dependent on the power plant in several ways (e.g., for supply of electricity or steam, but also production of gypsum relying on bi-products from the power plant).
 - The loss of business tax paid by the companies concerned is a major loss for local authorities. In the budgets of the local authorities under MERT's jurisdiction, the business rates paid by MERT's pseudo-taxes represent, in many cases, almost 100% of the budget.
 - MERT's water management will be completely transformed when lignite mining ceases, which could entail significant risks, e.g. the changes of run-off conditions.
 - Households using (part of) lignite for heating will find it more difficult to maintain adequate comfort levels in their homes.
 - The economic value added of SMEs in the County is lower than the rural average - their net value added is significantly lower than the Hungarian rural average. Meanwhile, around 38% of the potentially affected employees in the transition sectors work in SMEs. These companies may face greater difficulties than large enterprises in raising the finance needed to start the necessary steps in the transition process.
 - Heves County relies very heavily on the manufacturing industry and if it were to face any kind of crisis, workers and businesses could face great risks.
 - Low-skilled workers may have little or no access to employment for a long period of time, jeopardising the economic situation of the families concerned.
 - Some of the affected workers will move out of the County. Furthermore, the potentially counter-selective nature of the out-migration poses a serious threat to the future of the County.
 - The low mobility of the workforce may limit employment in locations further away from where it is currently located.
 - The presence of a 'skills gap', in particular a lack of digital skills, may make it difficult to locate workers.
-

Identification and prioritisation of economic sectors for START consultation and engagement

Introduction

This section considers the potential sectoral focus of START consultation and engagement in Heves County. The selection of sectors is informed by the following criteria. Evidence of:

- sectoral growth or growth potential which can be facilitated or unlocked by support for green diversification and adaptation;
- sectoral potential to be a source of employment for displaced workers (Visonta miners, Matra Power Plant workers and those in MVM subsidiaries);
- regionally active research, education and training and support bodies to assist the sector in the process of green diversification and adaptation;
- eligibility for Just Transition Fund and EU funding support.

Evidence base

A range of existing documents were used to assist the selection of sectors. These included: the Territorial Just Transition Plan (2022); Report on growing regional sectors and activities (2021); and the economic development strategy for Heves County (2020). In addition, statistical data were utilised to gain an understanding of the structure and dynamics of the local economy (see Chapter 3: [Good practices and common opportunities and barriers for green economic diversification and adaptation](#)). The findings of a recent survey of Heves SMEs (142 recipients) were utilised to gather insights on the preferences and readiness for green economic diversification and adaptation.

Key Considerations

The Heves economy is heavily industrialised with several key large enterprises active in manufacturing and the energy sector. Moreover, the reach of these large enterprises extends to local supply chains. Service sector activities, especially in higher value segments

(e.g., information and communications, professional and technical services, financial services) are relatively undeveloped; although, in recent years, there have been tentative signs of rebalancing of the local economy towards services.

START support activities have a focus on Small and Medium-sized Enterprises (SMEs) in Heves – businesses with 1-249 employees – as these enterprises are intended as a primary target beneficiary group of the Just Transition Fund and other EU funding mechanisms. However, as Heves County is a relatively small regional economy with a comparatively weak and underperforming SME base (e.g., in terms of number, productivity and innovation, and R&D expenditure), it is questionable whether the existing SMEs currently possess the capacity to absorb the potentially large numbers of workers that may be displaced as part of a future energy transition. Therefore, should there be a sizable shock in the local labour market, it seems pertinent to also consider the possible role of larger enterprises (those with 249+ employees) as a source of future employment generation, either directly or equally importantly through their influence on local supply chains. Adjustments in the activities and processes of these larger enterprises that similarly feed through to their local suppliers have the potential to significantly impact on incentives and opportunities for greening of the local economy (e.g., in terms of adoption of circular economy practices and energy efficiency).

Heves County has shown the ability to attract large manufacturing investments, notably in Gyöngyös (in relative proximity to the Matra Power Plant and Visonta Mine); leading to manufacturing representing 60% of all business investment in the County and accounting for 35% of local GVA. In addition, literature, including a case study developed by the EU Coal Regions in Transition Initiative, indicates that the Matra Power Plant industrial park is a potential focal point for future job growth.

Initial identification of potential target sectors

[Table 5](#) presents a preliminary indication of possible target sectors that could be the focus for START consultation and engagement on the opportunities for green diversification and adaptation in Heves County.

Table 5: Indicative target sectors for assessment of green diversification and adaptation potential

Sector	Growth potential linked to green economy	Potential for job creation for affected workers	Regionally active research and support bodies	Eligibility for JTF and EU funding	Comments
Construction (incl. green construction value chains)	●●●	●●●	●	●●	Strong recent growth in number of enterprises Eligible for calls for proposals to strengthen the circular economy, improve energy efficiency and innovation based green economy
Food & drink (incl. viticulture, mushrooms, and biomass)	●●●	●●	●●●	●●●	Important traditional economic sector in Heves County and main land use in the areas affected by mining Among top-3 sectors for manufacturing investment One of largest producers of mushrooms in Hungary
Green energy transition (incl. PV, heat pumps, and energy storage)	●●●	●●●	●●●	●●●	Anticipated high demand Site of first large-scale solar power plant in Hungary; licensing of further solar plants in progress Energy storage eligible for innovation and green economy calls for proposals for funding under JTF
Transport & logistics (incl. e-mobility)	●●●	●●	●	●	Strong recent growth in transport and storage investment
Matra PP Industrial Park	●●	●●	●●●	●●● SMEs in supply chain	Anticipated strong growth in investment; Includes companies in sectors with high growth potential (e.g., construction, grain processing) Home to 13 companies directly linked to the power plant's activities, and 22 further companies benefitting from proximity to other business and labour availability
Other manufacturing (e.g., metals, automotive, plastics) and associated supply chains	●●●	●●	●●	●●● SMEs in supply chain	Accounts for over half of business investment and 35% of gross value added in Heves County
Legend:					
●●● = High potential					
●● = Medium potential					
● = Low potential					

Annex 1: Identification of target SMEs for engagement on green and circular development

Overview of SME database

The SME database selected from KSH data for Heves County. The criteria used to establish the database are based on location (Heves County), staff number between 10 and 250, and being an active company with a functioning email address. This identified 603 company entries, although subsequent review of the database revealed that it contained circa 50 micro-enterprises, which have been removed from the list. The final breakdown of companies by size category is shown below:

Small-sized businesses (10-49)	Medium-sized businesses (50-249)	Total number of SMEs in Heves County
455	100	555

Companies in the database are classified using TEÁOR (Hungarian statistical sector codes) which follow NACE Rev. 2.

Identification of high CO₂ emission sectors in Heves County

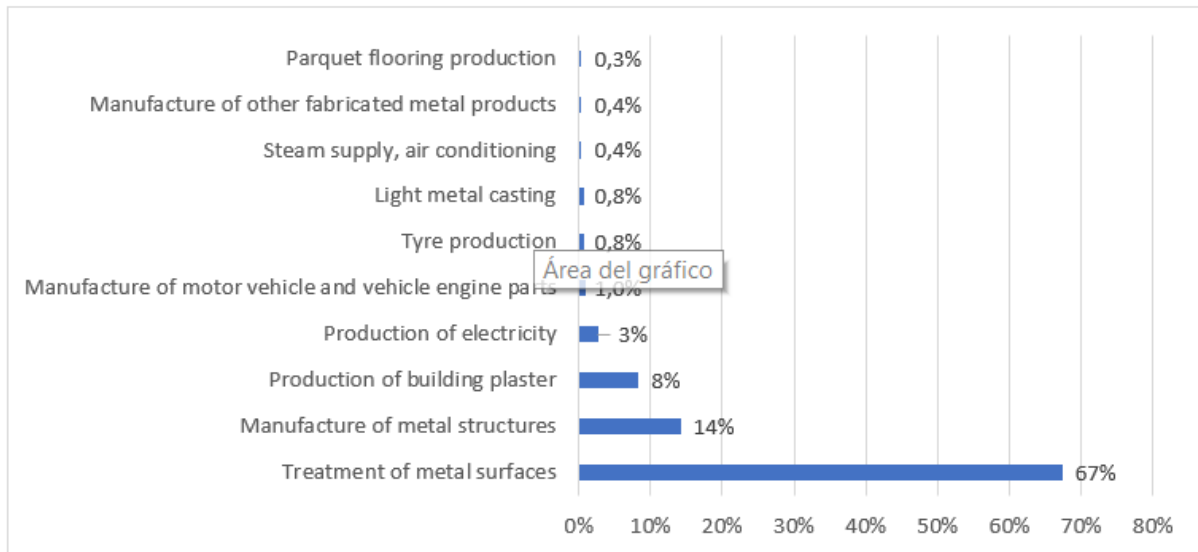
The LAIR (Air Pollution Information Module of the National Environmental Information System in Hungary) provides data on CO₂ emissions, covering Heves County for the years 2015 to 2020. The data includes emissions from large companies, although data for the Máttra Power Plant is included only from 2019. The Máttra Power Plant alone accounted for 87% of all CO₂ emissions in Heves County in 2020.

Combining data on CO₂ emissions per site (per company) and classifying companies by their TEÁOR activity, the economic activities with the highest levels of carbon emissions in 2020 are shown in [Table 5](#). Excluding the Máttra Power Plant, the sectors with the highest emissions are 'Treatment of metal surfaces' and 'Manufacture of metal structures', which collectively account for over 80% of emissions when the Máttra Power Plant is excluded.

Table 6: Top CO₂ emitting activities in Heves County in 2020

Economic activity	CO ₂ emission (tons/year)	% of total county emission	% of total county emission excluding Matra PP
Production of electricity	3 886 743	87%	3%
Of which Máttra PP	3 870 599	87%	-
Treatment of metal surfaces	396 867	9%	67%
Manufacture of metal structures	83 879	2%	14%
Production of building plaster	48 434	1%	8%
Manufacture of motor vehicle and vehicle engine parts	5 609	0,13%	1,0%
Tyre production	4 927	0,11%	0,8%
Light metal casting	4 483	0,10%	0,8%
Steam supply, air conditioning	2566	0,06%	0,4%
Manufacture of other fabricated metal products	2 328	0,05%	0,4%
Parquet flooring production	1 491	0,03%	0,3%

Source: authors calculations based on LAIR

Figure 21: Top CO₂ emitting sectors in Heves County in 2020 without Mátra PP

Source: authors calculations based on LAIR

Identification of target SMEs for engagement on green and circular economy development

For the purposes of identifying 'target' SME for engagement on green and circular economic development, three potential categories of target of enterprises have been identified:

- 1. Green economy:** companies with activities directly linked to the green economy, such as 'Energy production', 'Water, sanitation and waste', and 'Environmental services'.
- 2. Carbon intensive/GHG emitters:** companies with activities that are carbon intensive and/or associated with high levels of GHG emissions. These include companies in manufacturing sectors such as cement, metals, chemicals, or construction and transport.
- 3. Important in the local economy:** companies in (other) sectors that are important to the local economy in terms of their contribution to regional gross value added and or employment.

Based on the selected database (see above), the number of potential target enterprise under each of the above categories (by NACE/ TEÁOR sector) that can be identified are shown in [Table 6](#). In total, there are 173 identified target enterprises, of which 12 categorised as 'Green economy', 127 categorised as 'Carbon intensive/GHG emitters' and 34 categorised as 'Important in the local economy'.

Concerning the 'Green economy' category, it should be noted that as of 1 July 2023, a new waste management system came into force in Hungary, in which the collection and treatment of municipal waste in Hungary is carried out by MOHU MOL Hulladékgazdálkodási Zrt. Waste collection (strictly sorted) can only be carried out by MOHU, and recycling companies can buy waste only from MOHU. Under this system, MOHU's goal is to create a new, nationally uniform, predictable waste management, to create a more sustainable, transparent and traceable waste flow, and to enable MOHU, as the responsible party for domestic waste management, to facilitate the return of as many raw materials as possible to the circular economy.

Table 7: Estimated number of target SMEs by category and sector of activity

Economic activity		Number of SMEs	
Green economy			
35	Electricity, gas, steam and air conditioning supply	2	12*
38	Waste management	10*	
3811	Collection of non-hazardous waste*	6*	
3812	Collection of hazardous waste*	1*	
3813	Waste recycling	3	
Carbon intensive/GHG emitters			
20	Manufacture of chemicals and chemical products	2	127
22	Manufacture of rubber and plastic products	10	
23	Manufacture of non-metallic mineral products	5	
24	Manufacture of metallic raw material	6	
25	Manufacture of fabricated metal products	43	
41	Building construction	20	
42	Other building construction	18	
49	Inland and pipeline transport	29	
53	Postal and courier activities	4	
Important in the local economy			
01	Crop and animal production, hunting and related service activities	23	34
02	Forestry	1	
09	Mining	1	
11	Beverage production (wine production)	9	

Sectors with the highest CO₂ emissions in Heves County (based on analysis of LAIR data) are marked in grey.

*As of 1 July 2023, a new waste management system came into force in Hungary, in which the collection and treatment of municipal waste in Hungary is carried out by MOHU MOL Hulladékgazdálkodási Zrt.

Source: authors calculations

**Identification of green economy opportunities
and barriers in Heves County: Situation
assessment and review of EU experiences**