



MINISTRY OF ECONOMY, COMMERCE AND
RELATIONS WITH BUSINESS ENVIRONMENT



Bioeconomy industry in Romania

2016, Bucharest

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1. Industry overview

1.1 Key indicators

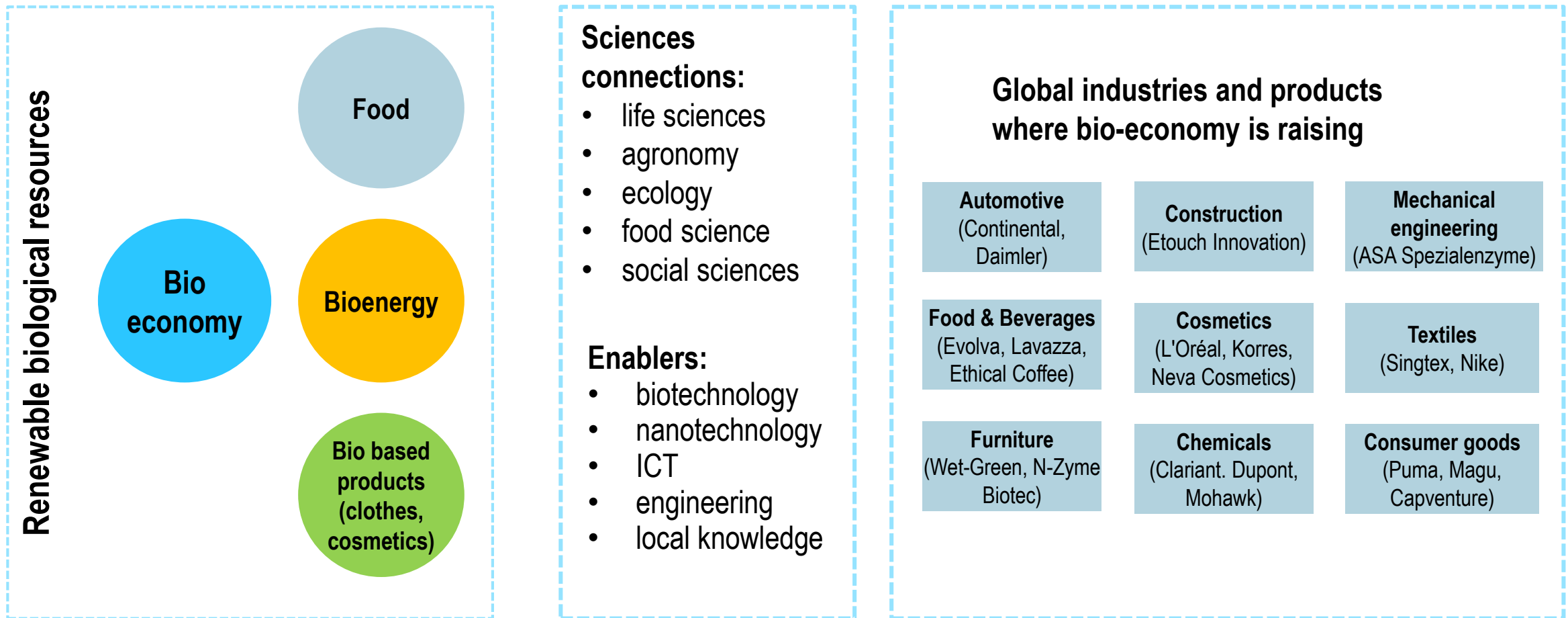
Bioeconomy is an emerging sector, as scientific progress and applied R&D became increasingly embedded in manufacturing, agriculture or healthcare

“Greater use of renewable resources is no longer just an option, it is a necessity. We must drive the transition from a fossil-based to a bio-based society, with research and innovation as the motor”

European Commission

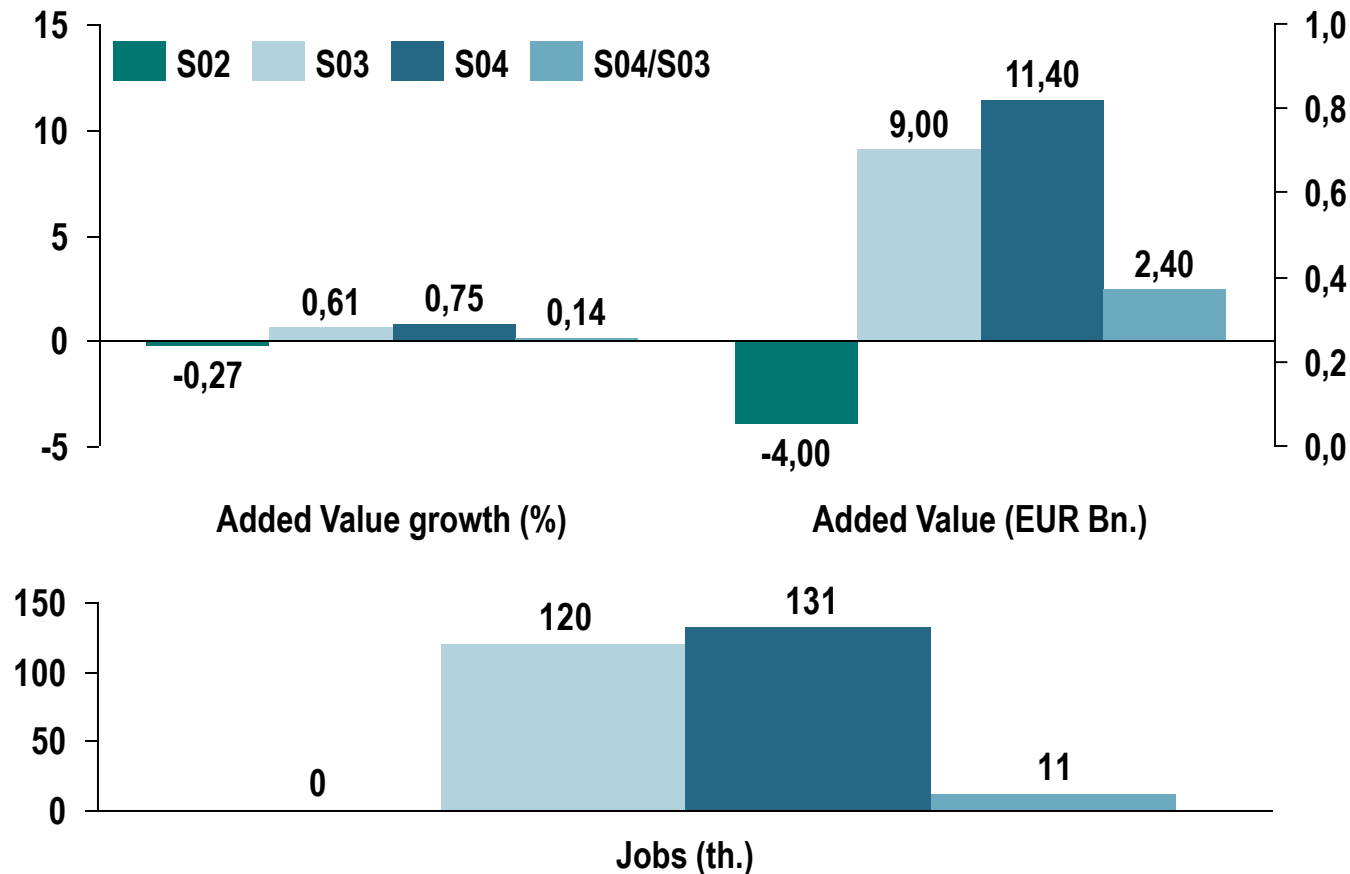
- At European level, bioeconomy (or the Blue Economy) provides around 22 million jobs (9% of workforce) and generates a EUR 2 trillion total turnover (more than 13,5% of EU28 GDP in 2015)
- New technologies, including underwater engineering and DNA sequencing, renewables biological resources and agricultural progress insure good premises for increasing this contribution, with significant economic, environmental and social impacts
- Bioeconomy sector is one of the EU’s main priorities, the public and private investments both, doubled by the investment Plan for Europe and other EU funds have been constantly reshaping the Blue Economy shifting it from *<a niche to the norm>*
- Direct research funding through European Commission initiatives (Bioeconomy Strategy and Horizon 2020) could generate about 130.000 jobs and EUR 45 Billion in value added within the bioeconomy sectors by 2025

Bioeconomy is an emerging sector, as scientific progress and applied R&D became increasingly embedded in manufacturing, agriculture or healthcare



There are four scenarios regarding the development of bioeconomy sector by 2025

Scenarios regarding bioeconomy development by 2025
(Difference against baseline scenario)



- Four scenarios have been considered to assess the social, economic and environmental impacts of more or less gradually progress in bio-economy domain by 2025:
 - S01:** “Business as usual” (Baseline scenario) – maintaining the current state
 - S02:** discontinued efforts at EU member states level
 - S03:** Bioeconomy is supported by both member states and the EU, mainly through **research and innovation** (Horizon 2020 programme)
 - S04:** Bioeconomy is supported by both member states and the EU through **policies interactions and research and innovation projects**

Romanian bioeconomy potential was assessed in terms of waste management, biotechnology environment and renewable energy



Criteria of assessment during 2008-2015:

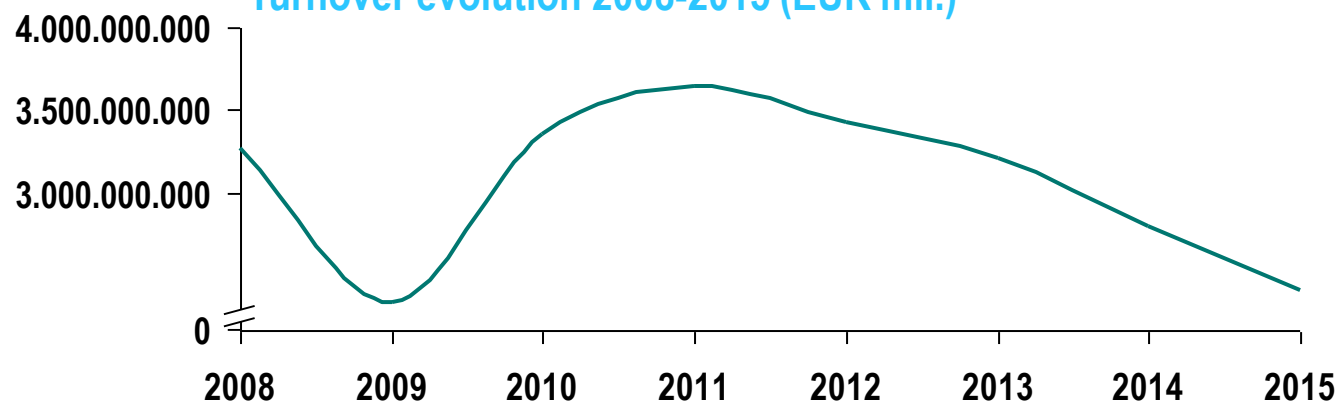
- Total turnover of the sectors
- No. of active companies
- No. of employees
- Labor productivity
- Net profit and net margin
- Market concentration degree

Domains subject to the analysis below include three large sectors within bioeconomy in Romania:

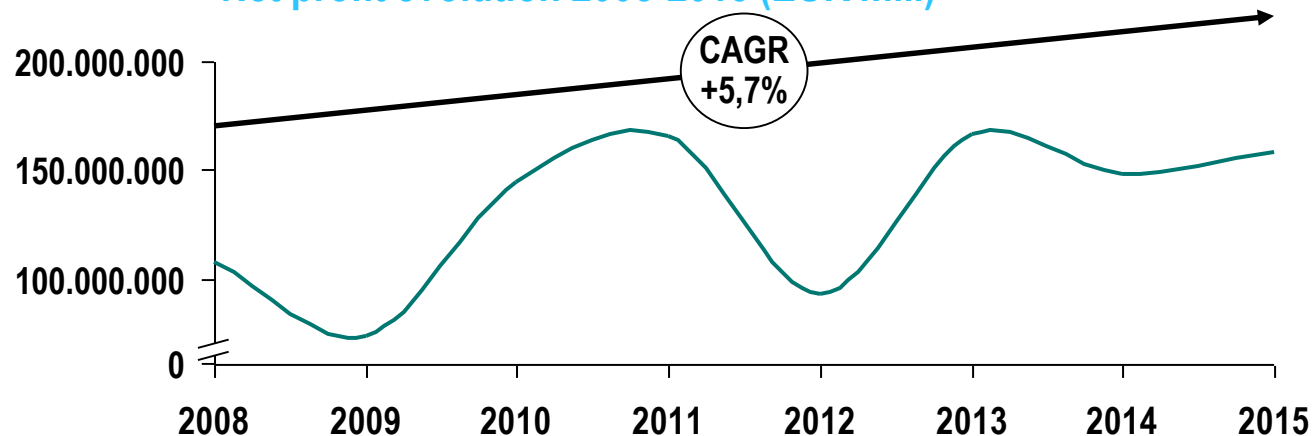
- Waste – collection, treatment and the recovery of recyclables materials
- Biotechnology
- Renewable energy (especially biomass and renewable wastes, geothermal, solar)

The total turnover of these three main sectors reached more than EUR 2.5 billion in 2015, with a significant net margin around 9-10%, especially in the energy sector

Turnover evolution 2008-2015 (EUR mil.)



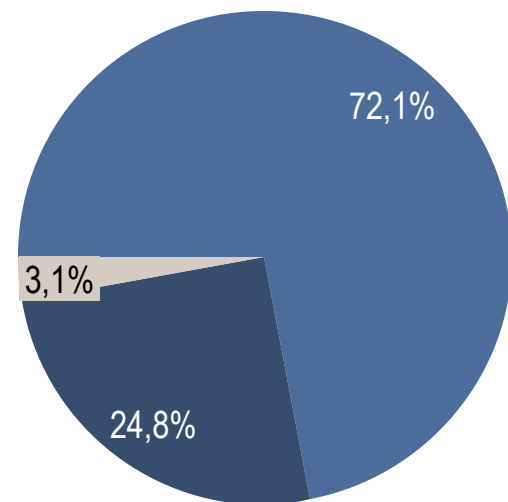
Net profit evolution 2008-2015 (EUR mil.)



- The bioeconomy industry generated a total turnover of approximately 2.5 billion euros in 2015, having the waste management sector representing the biggest segment of the industry, with a total turnover of EUR 1.7 billion
- A similar situation is noticeable for the net profits, the waste management sector being responsible for EUR 96 million
- However, the total turnover decreased in 2008-2015, while the number of companies expanded, suggesting that more companies segmented their activities, while the sector net profit increased
- There is a high potential for long-term business and investment

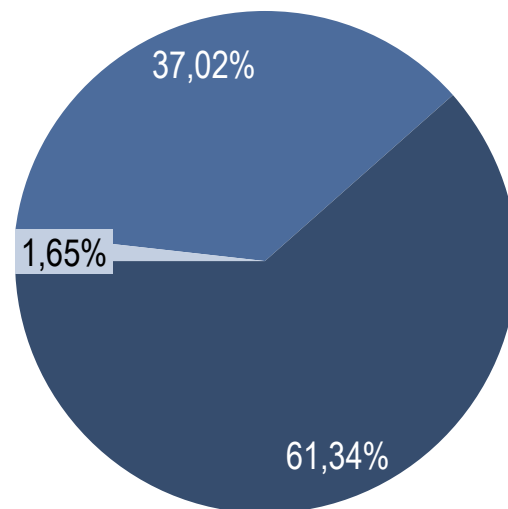
In Romania, the bioeconomy sector is dominated especially by waste management activities, accounting for 24.8% of total turnover and 61.34% of total profit in 2015

Turnover structure (2015)



- Waste management
- Renewable energy
- Biotechnology

Net profit (2015)

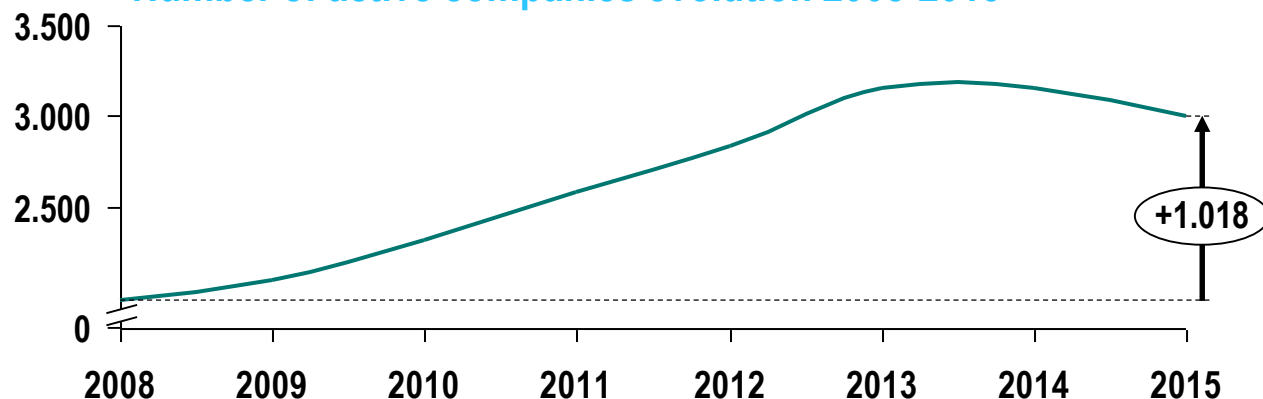


- Waste management
- Renewable energy
- Biotechnology

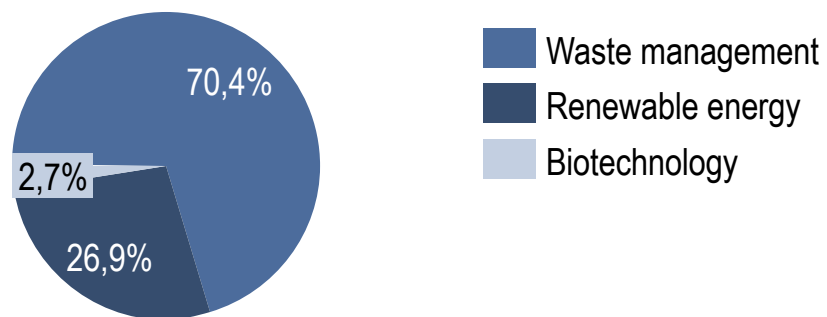
- The waste management services enjoy an aprox ¼ share of the bioeconomy total turnover.
- At the same time, in 2015 the waste management segment received more than 61% of the bioeconomy sector total profits.
- However, bio industry is a relatively new market in Romania enjoying high potential for long-term business and investment.
- The bioeconomy sector has 50,000 employees, most of them being active in waste management and energy production.

Starting with 2008, the number of active companies within the bioeconomy sector increased by aprox 1020 players (waste management, biotech and energy)

Number of active companies evolution 2008-2015



No. of companies structure (2015)



- In 2015 there were more than 3000 active companies conducting bioeconomy-related activities
- Waste management sector is represented by waste collection, waste management and recycling, playing a key role within the market with more than 2100 companies
- Renewable energy takes up a large piece of the market because it comprises numerous subsectors: hydro energy, solar energy, wind power, geothermal energy and biomass
- The entire energy production segment (electricity and gas) owns about 810 producers
- The number of companies operating biotech activities is significantly lower, with 80 players by the end of 2015

2. Waste sector

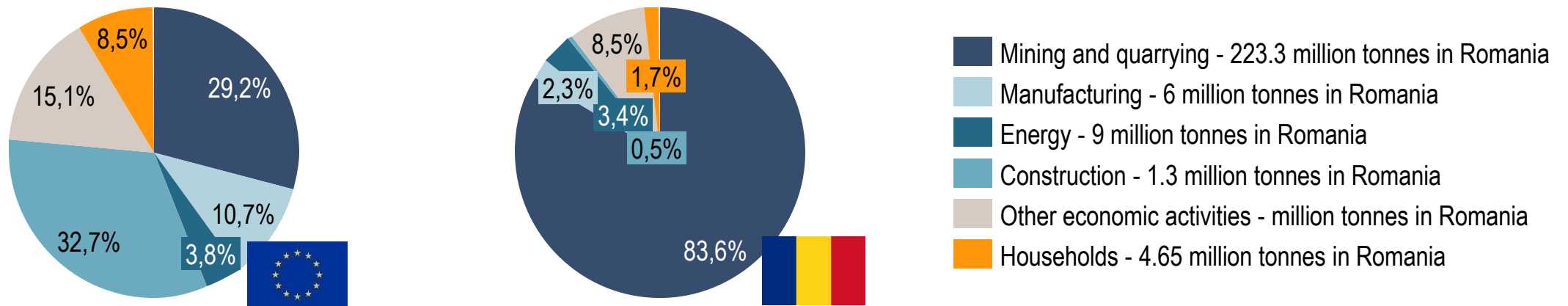


2. Waste sector

- 2.1 An emerging market
- 2.2 Macroeconomic indicators
- 2.3 Current situation
- 2.4 Key players
- 2.5 Government support

In Romania, since 2013, the biggest part of waste generation is provided by the mining and quarrying sector

EU 28 vs Romania waste generation by activity sectors (end of 2012)

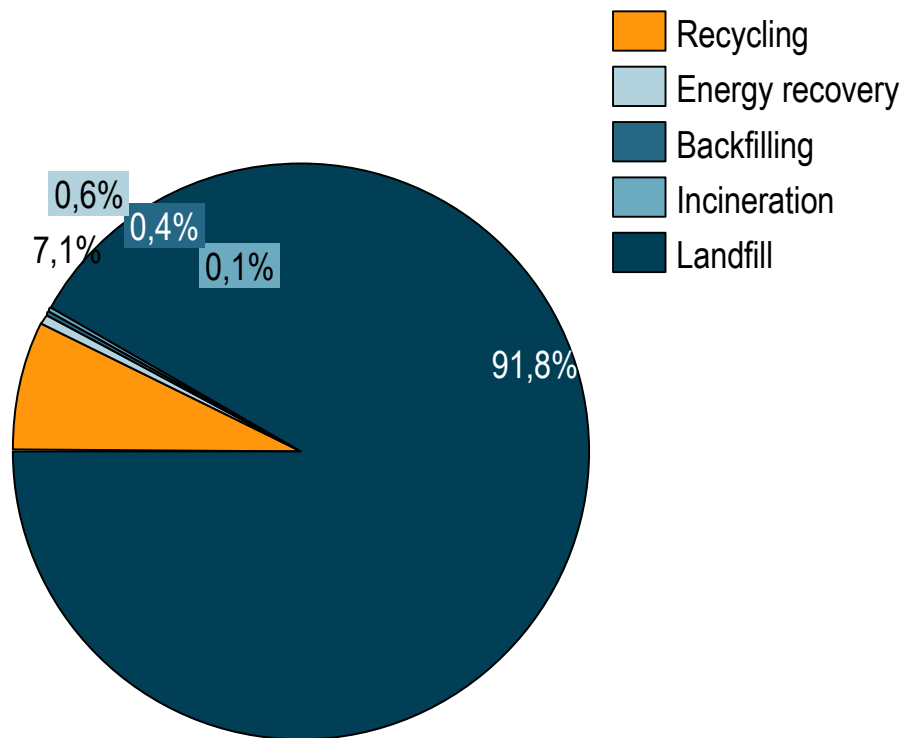


Waste generated by households (end of 2012)



- In EU, the relative share of mineral waste in the total waste generated varied considerably between Member States
- In general, Member States that had higher shares of mineral waste were those that were characterized as having sizeable mining and quarrying activities (such as Bulgaria, Finland, Estonia, Sweden and Romania)

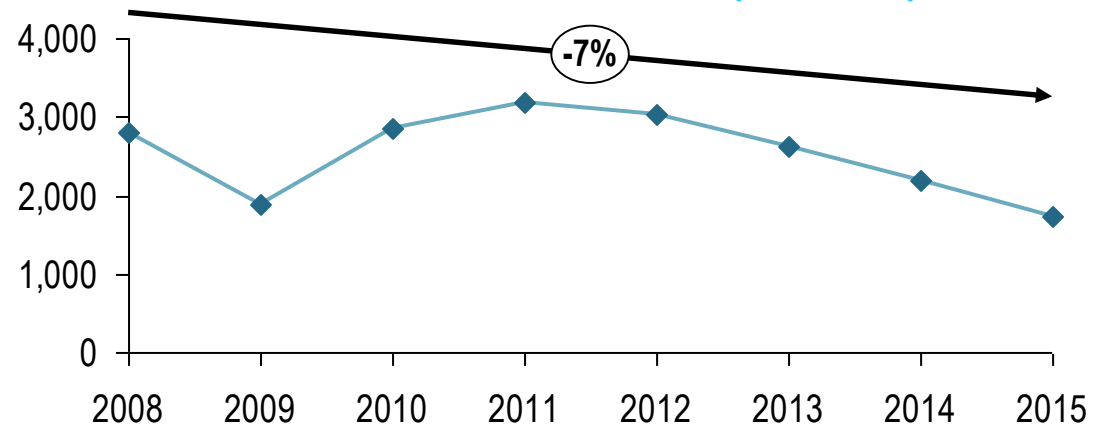
Since 2013, 92% of total waste generated is being treated mostly by landfilling, making Romania an attractive market for recycling technologies or energy production



- In Romania 92% of the total waste generated is treated landfill
- At national level, the amount of recycled waste accounted aprox. 18,85 million tonnes, less than 7% of the total, while the energy recovery used aprox. 2 million tonnes of waste
- The recycling branch is still under research and development conditions and represents a powerful source of foreign investment

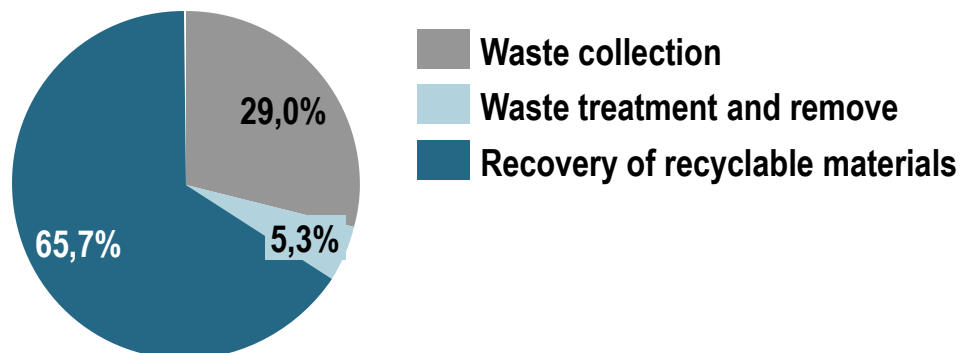
Waste management sector total turnover decreased between 2008-2015, the most important activity being the recyclable materials recovery

Total turnover evolution 2008-2015 (EUR mil.)



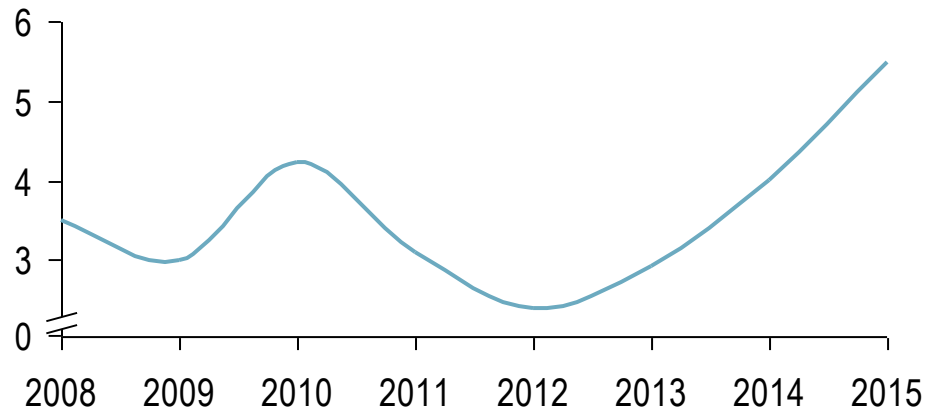
- The total turnover declined in waste management sector more than EUR 1 billion (CAGR = -7%)
- The sector is represented by waste collection (29%), waste management (5.3%) and recycling (65.7%), together accounting for 12% of the bioeconomy industry
- The recovery of recyclable materials segment had the largest contribution at the 2015 turnover. It has generated more than EUR 1,14 billion of the total turnover in waste sector.

Turnover structure (2015)

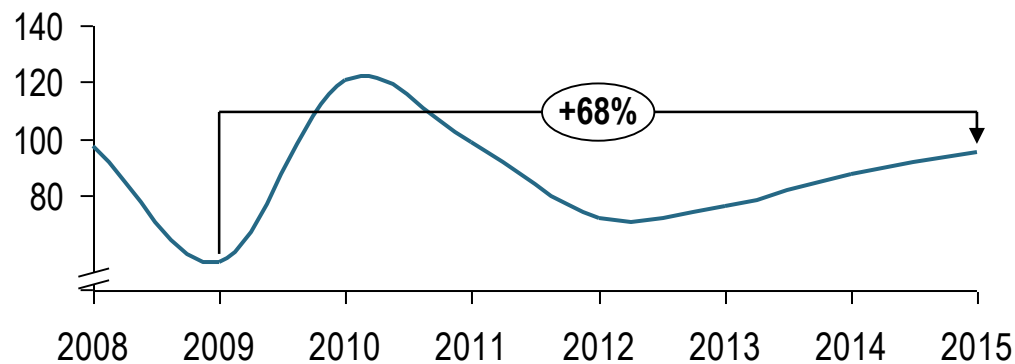


Starting 2012, the waste sector has been constantly profitable, while net margin increased at approximately 6% in 2015

Net margin evolution 2008-2015 (%)



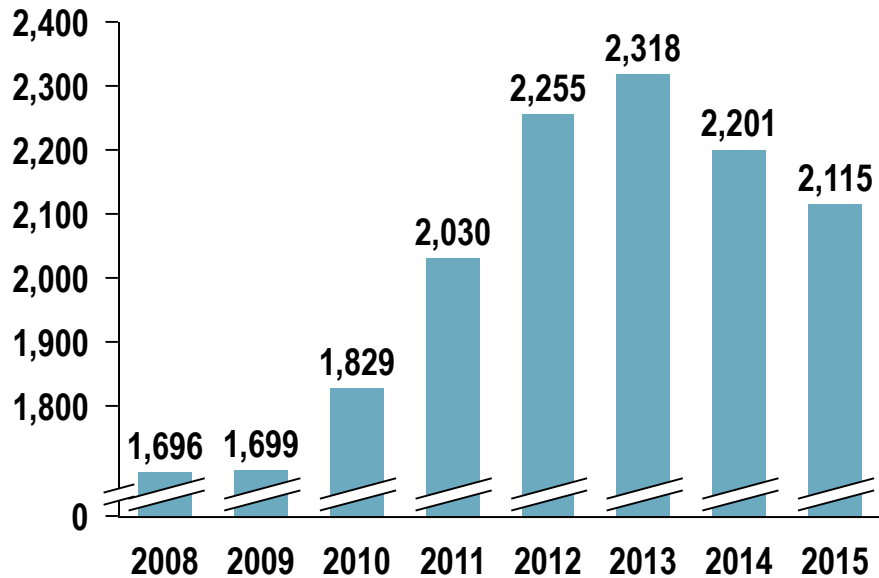
Net profit evolution 2008-2015 (EUR Mil.)



- Although the financial crisis in 2008 caused fluctuations, starting 2012 the waste management companies' profit has been constantly increasing
- In 2015 net profit reached the pre-crisis level of aprox. EUR 100 million
- The net margin in 2015 reached at 5.5%

The waste management sector generates nearly 40,000 jobs in collection, management and recycling services

Number of companies evolution



- There were over 2000 companies in the domestic waste sector in 2015, providing almost 40,000 jobs
- The labor costs are very accessible and there is a pool of unskilled and skilled workforce for the main jobs, such as collection, transportation, management and development of technologies for recycling
- The unskilled workforce benefits from an additional premium between 15-20% of the basic wage, for working in special and difficult environment
- Investing in management and recycling of waste is a safe source of revenue, since the industry is still relatively new in Romania
- With a recycling rate of approximately 7% and a relatively low cost of labor, the market has high potential

Number of employees(2015)	Average gross salary/year (€)	Labor cost/employee/year (€)
39,500	4,420	5,824

GreenGroup Romania is the biggest recycling park in South-Eastern Europe, with 6 companies specialized in collection and recycling of waste

Green Group companies

GreenTech S.A. is one of the most important plastics recyclers in South-Eastern Europe, with offices in Romania, Greece, Germany and Macedonia

GreenFiber International S.A. is the only producer of synthetic polyester fiber and PET band from Romania and the second largest in Europe

GreenWEEE International S.A. is the biggest integrated treatment plant for electric and electronic equipment waste (WEEE) in Romania and one of the most modern in Europe

GreenLamp Reciclare S.A. is the only recycler in Romania which is using an in-house distillation process in order to separate fluorescent tubes components and other discharge lamps such high intensity discharge lamps (HID)

GreenGlass Recycling S.A. is the most advanced glass recycling plant in Romania; the company provides high purity glass cullet (98% purity minimum)

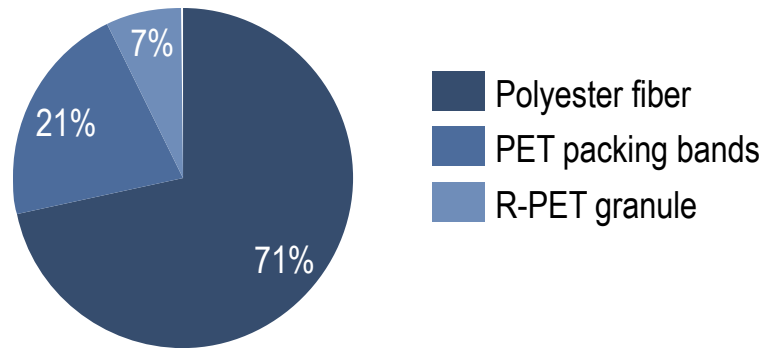
Total Waste Management S.R.L.

Company	Turnover 2015 (€)	Net profit 2015 (€)	No. of employees
GreenTech S.A	37,863,899	57,329	616
GreenFiber International S.A	68,327,980	5,799,363	557
GreenLamp Reciclare S.A	329,226	132,092	29
Total Waste Management S.R.L	6,239,146		163

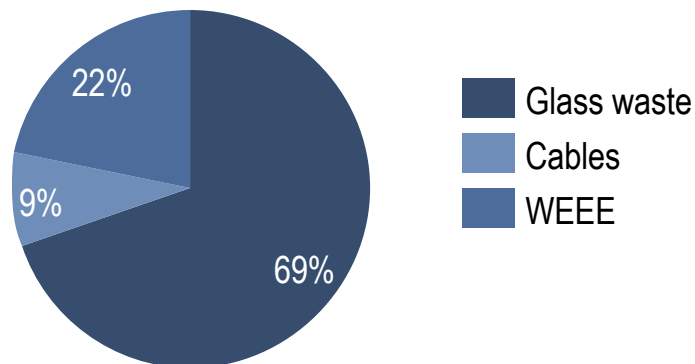


GreenGroup Romania registered a EUR 105 million turnover in 2015 with over 1200 employees

Products from recycling



Materials recycled since 2013

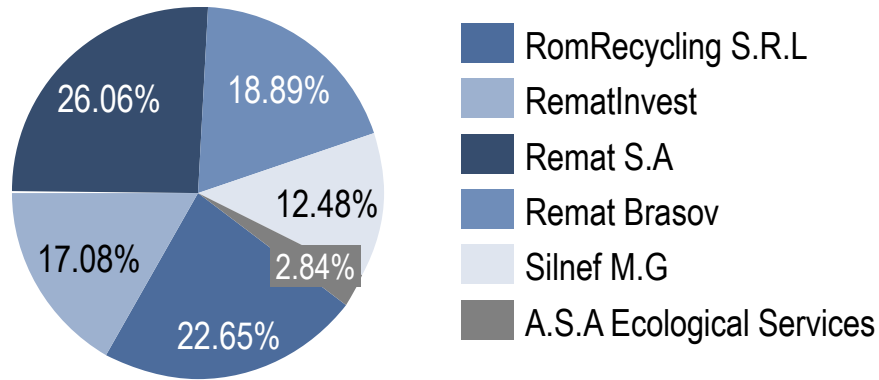


- Green Group is the second highest producer of polyester fiber, owning one of the most advanced treatment plant for electric and electronic equipment waste (WEEE) in Europe, with a capacity of 50,000 tones/year
- The Group also produces PET packing bands and R-PET granule from 20.000 tones of material
- They recycle 110.000 tones of glass every year since 2013, approximately 13.500 tones of cables and 35.000 tones of WEEE
- Green Group together with Carrefour Group and Eco paper, launched at Galati Shopping City Mall the first intelligent waste collection station in Galati, named SIGUREC Prime
- SIGUREC project is part of the financing scheme offered by Norway, through the Norwegian Grants 2009-2014. The programme managed by Total Waste Management - a leading provider of waste management services and member of the Green Group. It aims to increase competitiveness of green enterprises, including greening of existing industries, green innovation and green entrepreneurship.

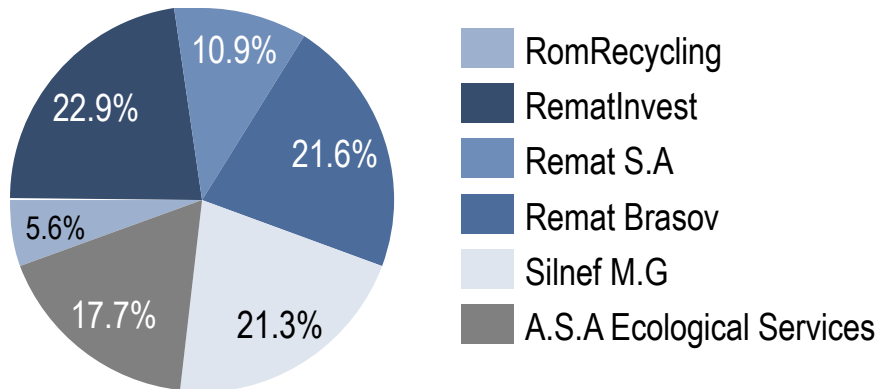


The most important key players on the market have a cumulated turnover of Euro 220 million and provide over 960 jobs

Turnover (2015)



Share of employees (2015)



- The most important key players on the local scrap market are Remat Călărași (Tawil Group), Remat Brașov, Romrecycling, Rematinvest (which consist of 20 former state companies), Silnef M.G and A.S.A Ecological Services
- Remat S.A provided the highest turnover, around 57 million euros, followed by RomRecycling with 50 million euros. Remat Brasov and RematInvest registered 41 million and 37 million euros, respectively
- .A.S.A. Ecological Services is one of the most modern waste management company in Romania and had a 6 million euros turn over in 2014 with more than 171 employees
- The 6 companies created 966 jobs; RematInvest employs 221 people, followed by Remat Brasov with 209 and Silnef MG with 206

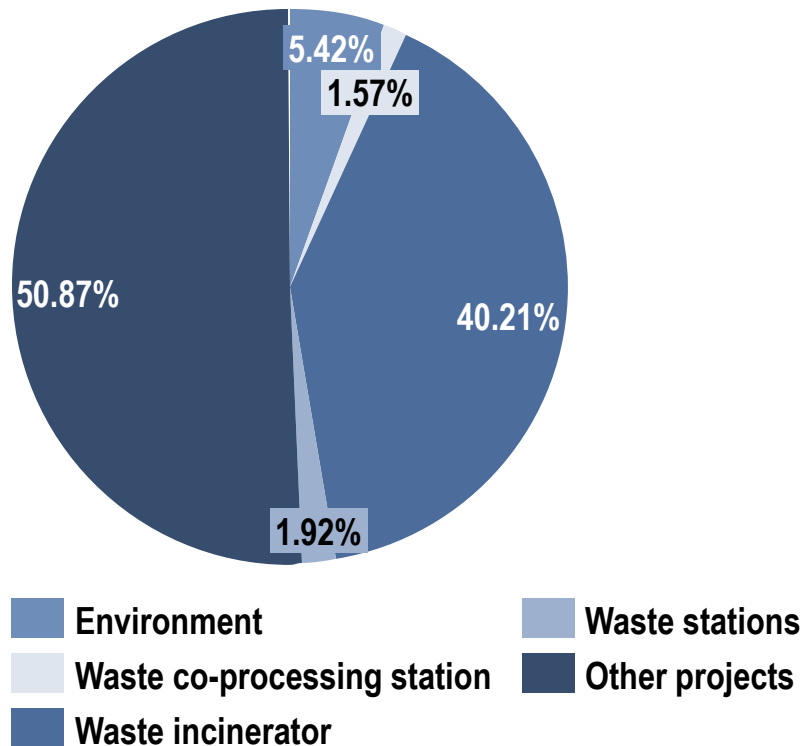
Sustainable Waste Treatment S.L (SWT) is a Spanish waste management company with over EUR 25 million invested in Romania in 2016



- The project started off in May 2016 and is to generate over 35 jobs
- Sustainable Waste Treatment S.L. (SWT) is an investment and project management company, on waste recycling and renewable energy, with entirely private capital
- It currently has more than 20 ongoing investment projects in Europe, Asia and South America
- The investment in Romania is part of an integrated project entailing a factory in Galati for processing raw materials resulted from recycling (plastic and glass). The cumulated value of the two projects (Tecuci and Galati) amounts EUR 80 million and will create 145 new jobs.
- The SWT investment aims to achieve a complete recycling system, patented throughout Europe, comprising an integrated sorting, treatment, recycling and recovery of waste station, that will produce electricity and heat energy, with a processing capacity of 200,000 tones / year waste collected
- The technology used by the Spanish company does not involve water in waste treatment, thus simplifying the entire process

139 environmental projects are expected to receive EU financing in Romania through the Large Infrastructure Operational Program (LIOP) 2014-2020

Project investments



- The 139 projects have a cumulated value of 8 billion euros. 21 of them are in the waste infrastructure sector and have a value of 572 million euros
- So far, Romania has received EUR31 mil from the European Economic Area (EEA) and Norwegian Grants for environment
- Lafarge investment is about EUR 9 million in waste co-processing station in Medgidia (with 3.5 million obtained through the European Regional Development Fund)
- Bucharest is to have a waste incinerator by 2020, following estimated investments of approximately 230 million EUR from European funds
- Investment of EUR11 million in waste stations in Mehedinți for mechanical, biological treatment and sorting stations have been finalized in December 2015
- ECOTIC, the first scheme of producers and importers of electric and electronic equipment in Romania, has managed over 12,500 tones of WEEE in 2015, up by 14% compared to 2014

The National Plan for Waste Management (2007-2013) directed €1.17 bn to waste management and recycling, out of which €930 mil are via EU funds

- EU legislation on the Waste Management was transposed in Romania at the level of 100%
- The waste management is based on Romanian National Strategy for Waste Management (RNSWM) and National Plan for Waste Management
- The activity of waste management in Romania is controlled through the regulations of:
 - Ministry of Environment and Forests is the public authority responsible with the coordination of implementation of the Waste Framework Directive and resulting Romanian legislation – environmental permit, directly or through the National Environmental Agency or its Regional Environmental offices
 - Protection Agencies (control the permits for the investments and activities there are under the IPPC Directive) and County Environmental Agencies
 - Ministry of Economy, Commerce and Relations with the Business Environment – revaluation permits
 - National Authority for Public Services – licensing
 - National Environmental Guard – enforcement
 - Local authorities – work permit for operation - Local authorities are involved in operations like setting up systems for separate collections, processing, storing etc., as well as the coordination of activities in the field of pre-collection and the waste recycling organization

3. Renewable energy

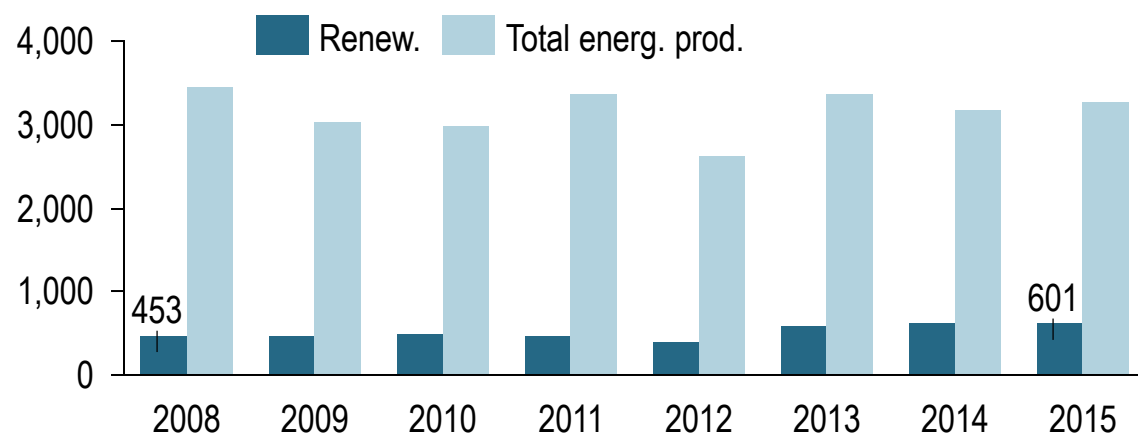


3. Renewable energy

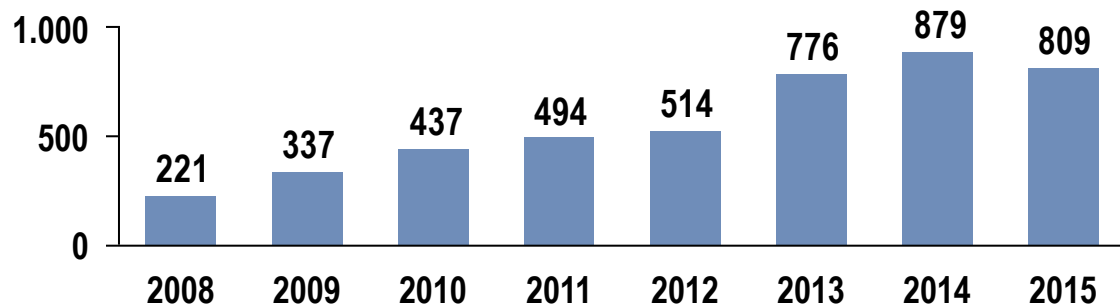
- 3.1 Macroeconomic indicators
- 3.2 Human capital
- 3.3 Main locations
- 3.4 Present situation
- 3.5 Hydroenergy
- 3.6 Wind power
- 3.7 Solar power
- 3.8 Biomass
- 3.9 Geothermal power
- 3.10 Government support

Key macroeconomic indicators of the Romanian Energy production sector

Turnover evolution in energy production (2008-2015)



Number of companies in energy production (2008-2015)

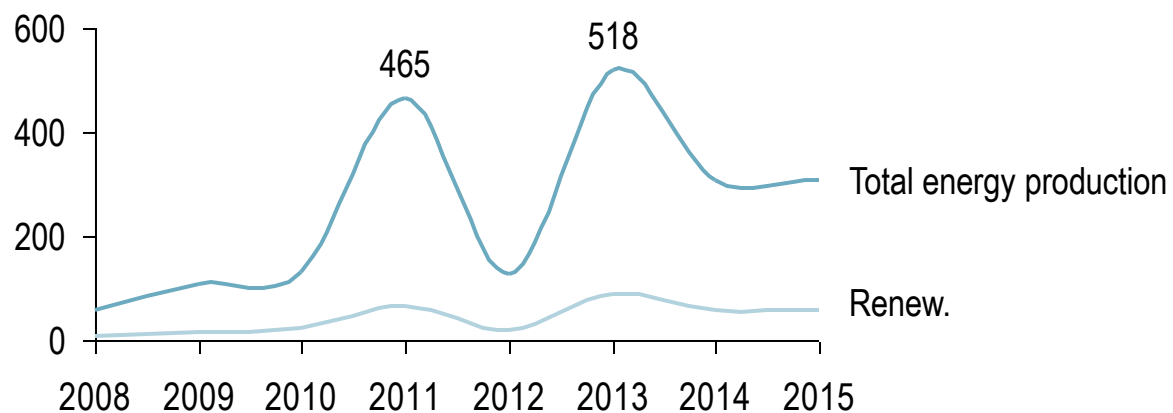


- Over the last 8 years the total turnover in energy production slightly decreased as the energy intensity of the economy reduced. That reduced the total turnover in both electricity and gas production segments
- At same time, the renewable energy production* increased amid the governmental support after 2012
- However, the number of active companies (positive turnover) increased both in electricity and natural gas production, including from renewables resources from 221 in 2008 to 809 companies in 2015

*Turnover in renewable energy production was obtained by weighting the total turnover in energy sector (electricity and gas) with the share of renewable energy consumption in total gross inland consumption

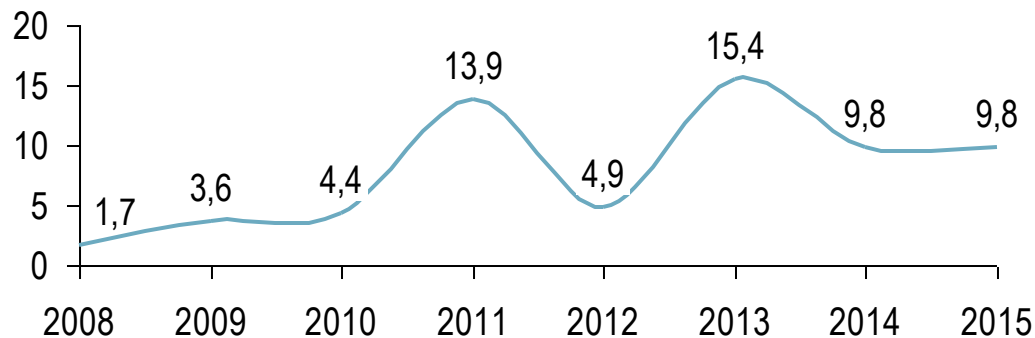
Key macroeconomic indicators of the Romanian Energy sector

Net profit evolution 2008-2015 (EUR Mil.)



- Romania succeeded in having a net margin of approximately 10% in 2015
- At the same time, after the boom of almost EUR 520 million in 2013, the estimated net profit exceeded EUR 880 million

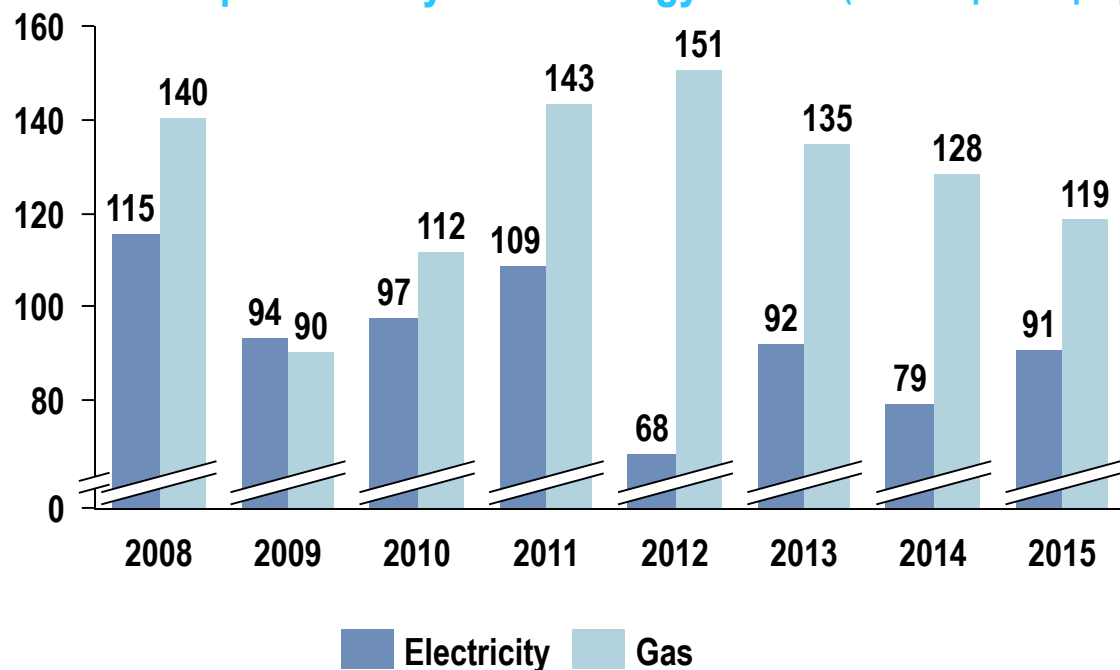
Net margin evolution in energy production (%)



The whole energy production sector provides over 35,700 jobs in Romania, with more than 35,000 employees in the electricity sector

Number of employees in 2015	Average gross salary/year (€)	Average cost for labor force/employee/year (€) in 2014
35,695	12,000	14,840

Labor productivity in the energy sector (EUR th. per employee)



- There are 800 companies in the energy production sector in Romania, providing 35,700 jobs
- Between 2015-2016 there were around 1200 students in Bucharest and Cluj-Napoca, in management, R&D of renewable energy and adjacent technologies
- Currently, the labor productivity is around EUR 90k in electricity production and 120k in gas production

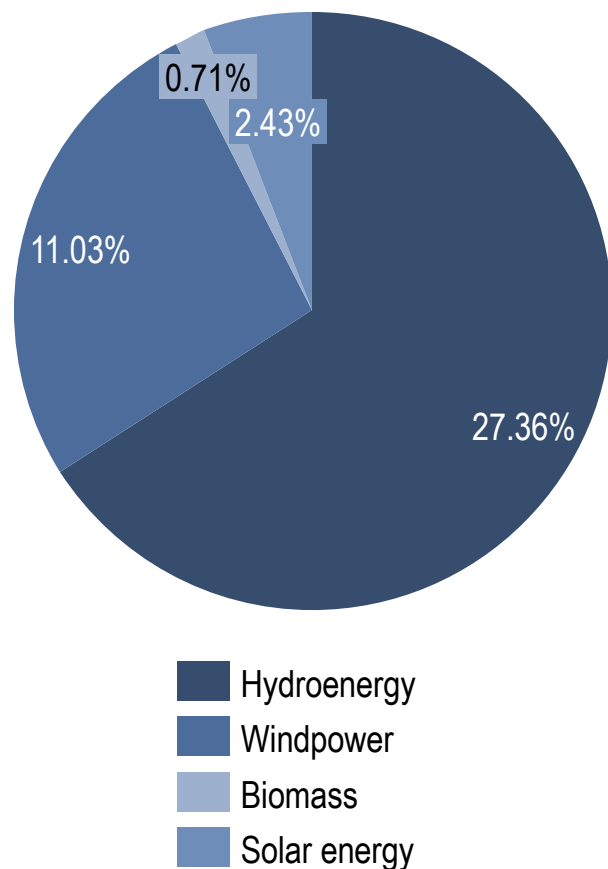
With 27% renewable energy, Romania reached 3 years earlier the 24% target set for 2018

Romania's locations enjoying high energy potential:

- Danube Delta – solar energy;
- Dobrogea – solar and wind industry;
- Moldova - micro-hydro, wind, biomass;
- Carpathians – biomass and micro-hydro;
- Transylvania - micro-hydro;
- Western Plateau- geothermal;
- Sub Carpathians – biomass and micro-hydro;
- Wallachian Plain - biomass, geothermal and solar.



In 2015, Romania has already reached its 2020 target

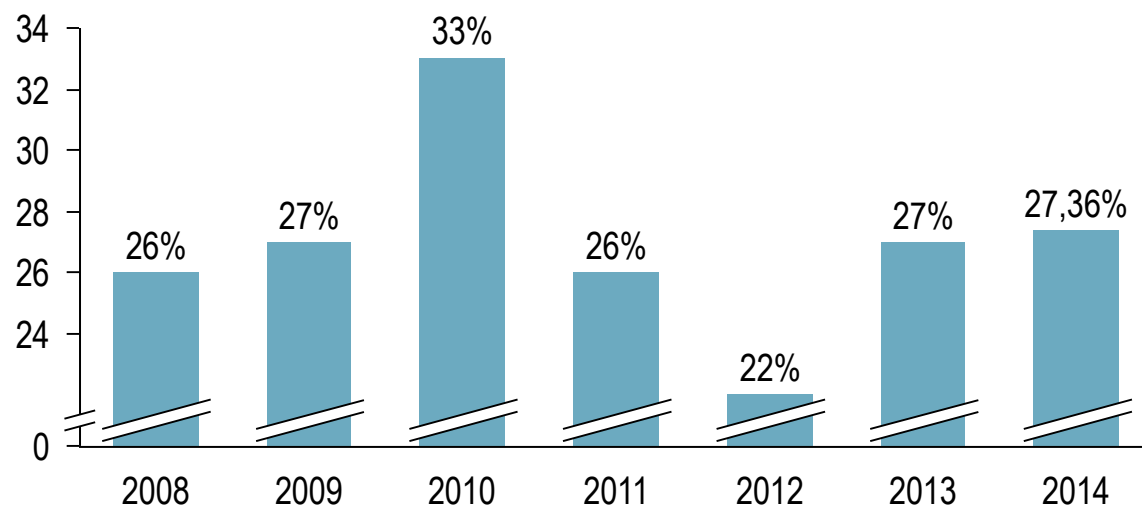


The structure of electricity production of Romania in 2015 was provided by:

- Non-renewable energy sources: 59%
- Renewable Energy sources: 41% out of the total amount of electric energy:
 - 27.36% - hydro-energy
 - 11,03% - wind power
 - 0.71% - biomass
 - 2,43% - solar energy
 - 0.01% - other renewable sources

The production of hydro energy has been increasing since 2012

Hydro energy production 2008-2014



The country's hydropower potential is extremely large with an estimated total usable hydropower of approximately 36 TWh per year

A significant part of this potential is already used for electricity generation counting for around 30 % of the total power delivered to the grid. The vast majority of this production results from large-scale reservoir hydropower plants

The most important water basins are: Olt, Lotru, Bistrița, Someș, Dragan, Argeș, Dâmbovița, Râul Târgului, Sebeș, Cerna, Bistra, Buzău, Motru and Danube

Other hydrographic resources include more than 2500 lakes, ranging from the glacial lakes of the mountains to those of the plains and the marshes of the Danube Delta region

There are more than 2000 locations in the Transylvanian mountains proper for the development of small hydro plants, with most of the potential projects located in Hunedoara and Sibiu counties

Both national and international companies are present in the hydro energy industry



HIDROELECTRICA

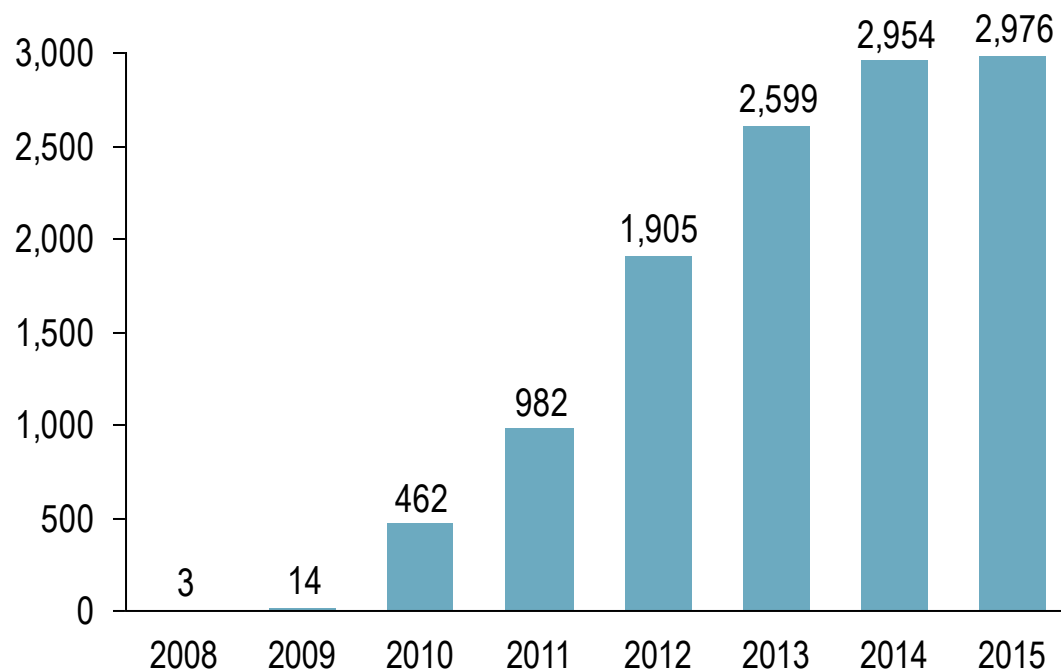


CEZ GROUP



Since 2008, the production of wind power has been increasing steadily, reaching its peak in 2015, with 2,976 MW.

Wind power production 2008-2014



In 2014, wind power reached a 2,954 MW installed capacity and a total of 2,976 MW at the end of 2015

Wind potential is mainly concentrated in the Dobrogea, Moldova and Banat regions. Dobrogea – and most notably Constanta and Tulcea – ranking 2nd in terms of potential in Europe (Erste Bank)

The main three counties with the biggest wind power potential are:

- Constanta “Romania’s greenest county”- having an installed capacity of over 1000 MW, worth more than EUR 1.5 billion
- Tulcea – having an installed capacity of over 464 MW, worth about EUR 700 million
- Galați - an installed capacity of 387 MW

Romania is among the ten most attractive countries for wind investments, according to the Ernst & Young Country Attractiveness Indices (on 40 countries)

Hidroelectrica S.A.

Hidroelectrica is an energy generation leader and the main supplier of ancillary services required in the National Energy System, being a key company in a strategic sector, significantly impacting the national safety. Hidroelectrica provides approx. 30% of the country's total production, depending on the hydrology of the year and approx. 90% of the ancillary services needed for the operation of the National Power System

In the 1st semester of 2016, the total output of 8.9 TWh was achieved within the 210 hydropower plants under operation, having an installed capacity of 6,434 MW

2015	Hidroelectrica
Turnover ['000 EUR]	707 mil eur
Net profit ['000 EUR]	200 mil eur
No. of employees	3.448
Exports ['000 EUR]	-

Main external partners:

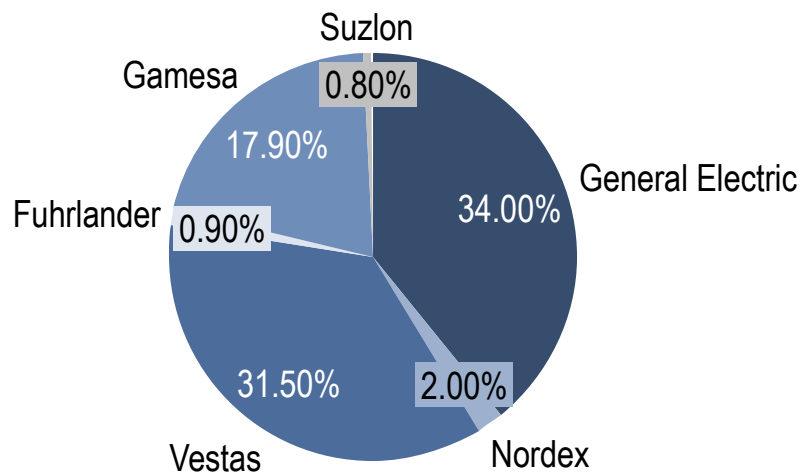
- Alpiq
- Energy Financing Team
- Luxten Lightning Company



Large foreign companies are present on the domestic market and other significant investments are yet to be implemented



Market share of the leading wind turbines manufacturers and suppliers in Romania



Announced investments:

- STEAG GmbH(Germany)
- Energy Rose Group(Cyprus)
- C-Tech and Rokura (Romania)
- Prowind(Germany)
- Marguerite (France) & EnerCap (CZ)
- Lukerg Renew(Lukoil – Russia) & ERG (Italy)
- Group Max Boegl (Germany)
- Eolen Vest(French)

In 2015, Romania ranked 19th out of 40 countries, by solar power capacity

In 2007 the country had an installed capacity of 0.30 MW, that increased to 3.5 MW by the end of 2011, and to 6.5 MW by the end of 2012. However, the record year of 2013 was an exception, and new installation fell back from 1,100 MW to a moderate level of 69 MW in 2014. In 2015, significant improvement was shown, with 102 MW installed capacity

Solar energy shows a moderate potential all over the country, but the most abundant solar resources are located in the Southern part of the country and Dobrogea

The five most attractive counties for PV projects are Timiș, Prahova, Ialomița, Bistrița Năsăud, Satu Mare

In 2015, Romania was on the 19th position out of 40 countries, with 1,301 MW of total solar capacity installed. China ranked first, with 43,060 MW and Luxembourg holds the last position, with 120 MW



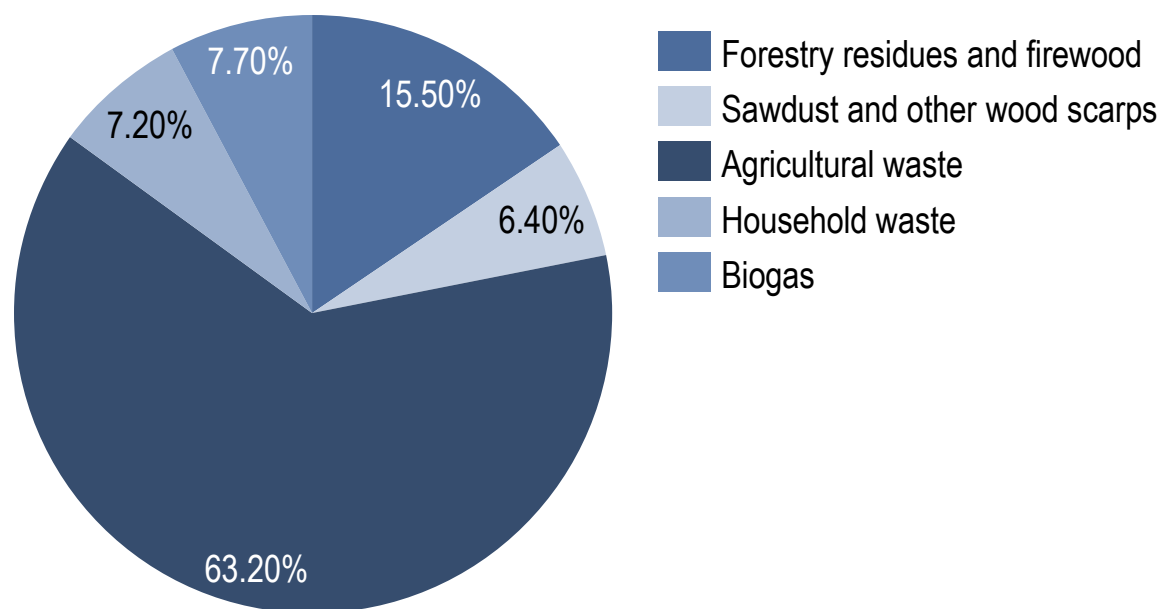
5 of the key solar energy suppliers in Romania generated EUR 5,697,500 in 2015 and provided 46 jobs



- Philro Industrial had the highest turnover in 2015 with more than EUR 4, 5 million and 35 employees
- Delphi Electric is a Belgian-Romanian company with a net profit of EUR 146, 000 in 2015 and 5 employees

Company	Turnover (€) 2015	Net profit (€) 2015
Rominstal	99,801.56	2,539.333
Suninstal	39,555.78	6,073.333
Delphi Electric	735,966.2	146,531.8
Philro Industrial	4,694,084	59,866.89
Iuco Top	128,092.9	14,513.11

More than a half of the total biomass potential is represented by agricultural waste, located mainly in Moldavia and the South and West Plain



- Biomass potential amounts to 318 PJ per year, out of which 15.5% comes from forestry residues and firewood, 6.4% sawdust and other wood scraps, 63.2% agricultural waste, 7.2% household waste and 7.7% biogas
- About 66% of the firewood and wood waste is located in the Carpathians and Sub-Carpathians, and about 58% of agricultural waste is located in the South Plain, West Plain, and Moldavia
- Approximately 63,700 km² of Romania is covered by forests, approximately 27% of the total land. The exploitable potential of the Romanian forests is estimated at 20,000 cubic meters
- The largest quantity of biomass energy is produced in Alba county

The main biomass power plants are owned by Holzindustrie Schweighofer, Gregor, General Electric and Iridex Group



Geothermal energy the main source of heating in certain parts of Romania

Geothermal energy is currently used mostly for district heating, spas and greenhouse heating. 5,500 residences in Oradea and the entire city of Beiuș are heated by geothermal energy

Further geothermal development is technically and economically feasible in Romania (mainly for existing wells)
The largest quantity of energy from geothermal sources is produced in Bihor country, mainly in the towns of Oradea and Beiuș

Transgex S.A. is currently one of the largest domestic players in exploiting geothermal resources



2015	Transgex SA
Turnover ['000 EUR]	3079.535
Net profit ['000 EUR]	641.976
No. of employees	82
Exports ['000 EUR]	-

Low level of energy dependence due to its own gas, oil and coal reserves

Being part of the Energy Union Strategy, Romania is likely to enjoy certain potential benefits:

- **Internal Energy Market:** Market integration of renewables and regional cooperation in relation to support schemes will increase the cost-effectiveness of Romania's renewable production. Electricity interconnections and enhanced cross-border trade will help control electricity prices and increase the country's security of electricity supply. The completion of gas interconnections and reverse flow projects will support increased exploitation of domestic gas sources
- **Energy Efficiency:** The Energy Union will strengthen the targeted use of financial instruments for increased investments particularly in the transport and buildings sector. It will help ensure that Romania harvests the economic and other benefits of reducing its much-higher than-average energy intensity
- **Research and Innovation:** The Energy Union's new strategy for Research and Innovation could support Romania's further progressing on low-carbon technology development



Green certificates system in Romania

Adhering to the European Union initiative to promote the “green” energy, Romania supports renewable energy sources (e.g. wind, solar, bio liquids, biogas etc.) by means of a compulsory quota system based on green certificates. Law no. 220/2008 on the promotion of renewable energy sources transposes the provisions of the Directive no. 2009/28/EC of the European Parliament and of the Council on the promotion of the use of energy from renewable sources

In 2016, the mandatory quota for electricity produced from renewable sources that benefits from the green certificates subsidy system, stands at 12.15% of the gross end electricity consumption

The limit values of the GC in 2016 according to the Order no.3/2016 are:

- the minimum value is 132,4045 ron (29,3971 eur)
- the maximum value is 269,7247 (59,8856 eur)



4. Biotechnology



4. Biotechnology

4.1 Current situation

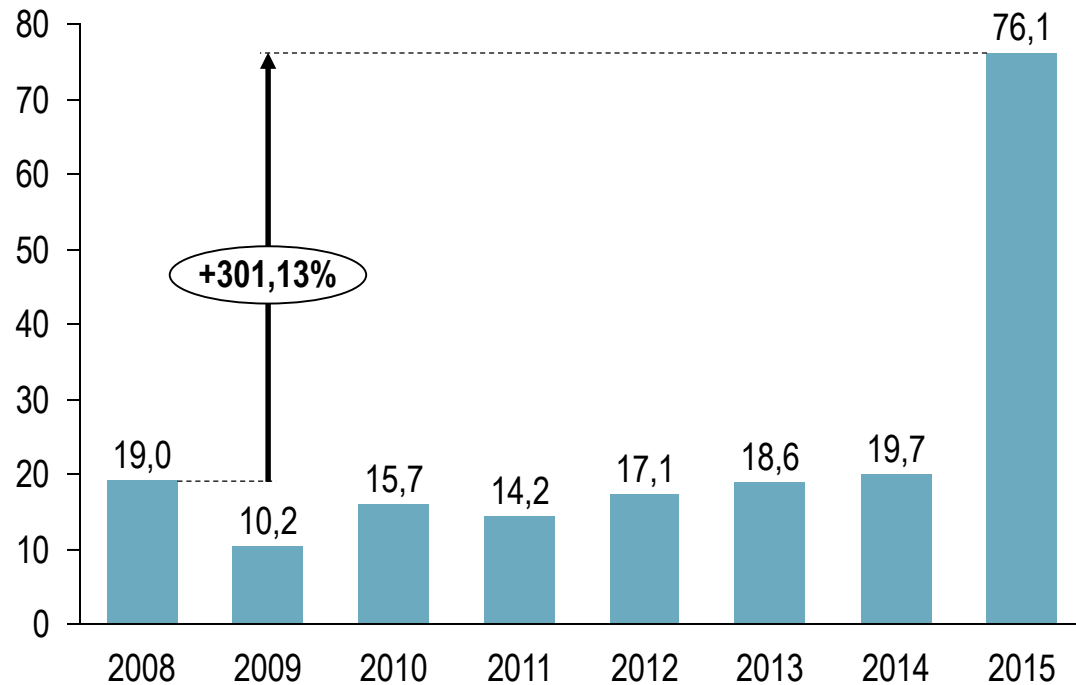
4.2 Human capital

4.3 Research&Development

4.4 Key players

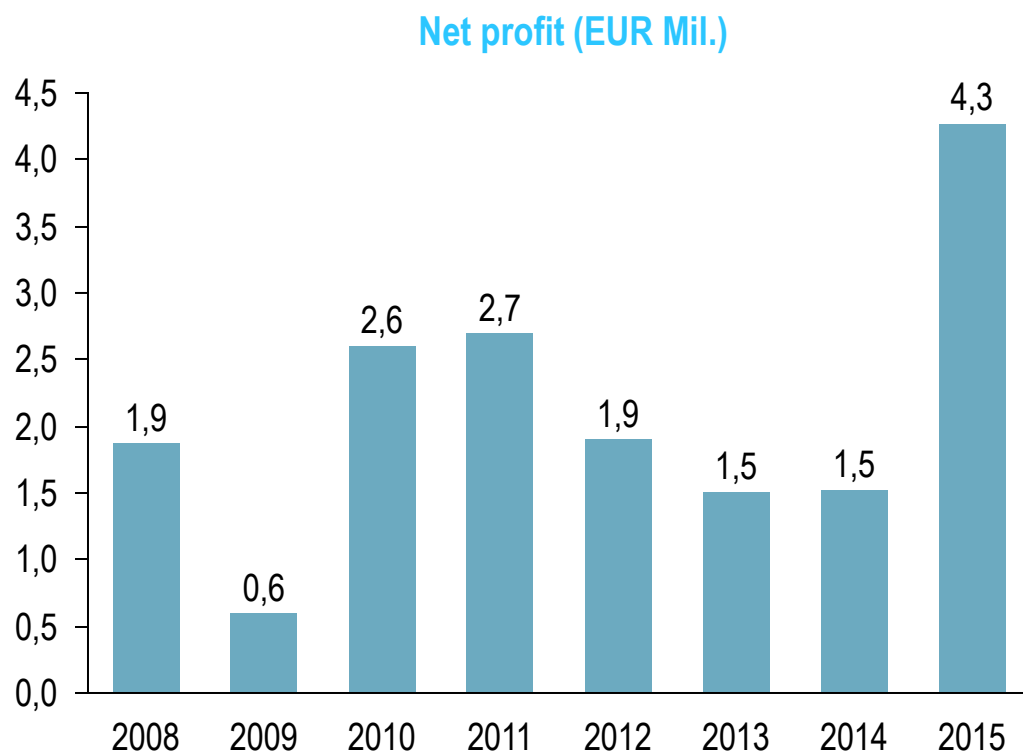
The biotechnology sector positive trend

Turnover (EUR Mil.)



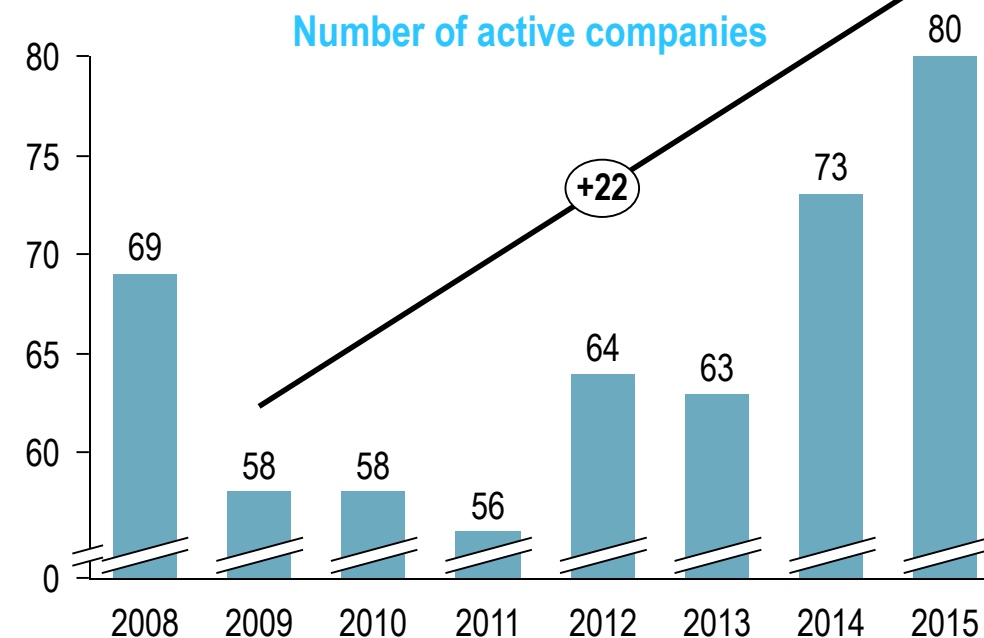
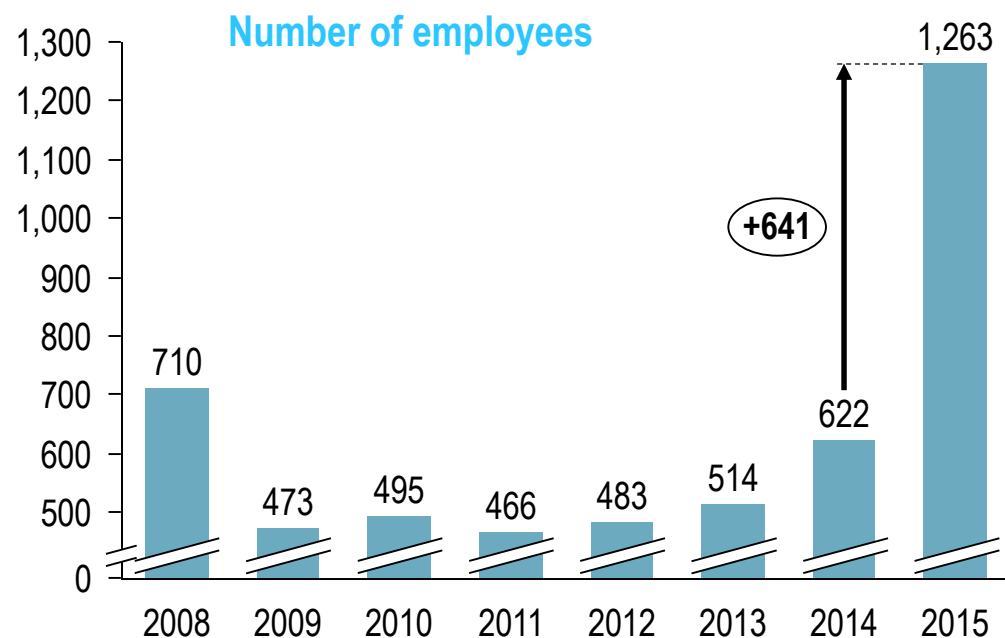
- Biotechnology was a powerful source of investment, as well as revenue in 2015, providing a turnover of 76 million euros in 2015
- Furthermore, biotechnology-based production in Romania rose at about 5 billion euros in 2014, as both food and drug industries rely on this innovative sector
- Between 2007-2013 the National Plan for R&D and Innovation relied mostly on promoting high quality research and innovation doubled by infrastructure building, strengthening human resources and increasing partnerships and cooperation
- Some priority fields include ICT, new materials, bio- and eco-technologies, industry, agriculture and food safety, health, energy, environment and transportation

The biotechnology sector profit tripled since 2014



- In 2015 the biotechnology sector generated EUR 4 million net profit, as investments are constantly being made in R&D of biotechnology, a priority since 2009
- In 2014, 43 projects were promoting research and development activities in health and medical sciences, initiated by entities such as Biotehgen, Romanian Association for Biotechnology and Cantacuzino National Institute of Research-Development for Microbiology and Immunology

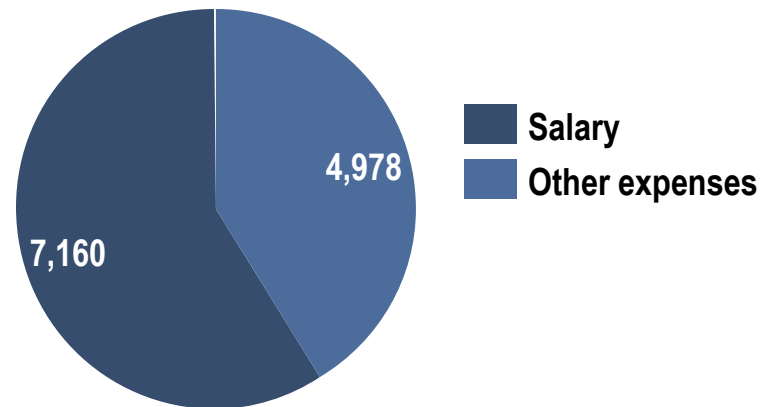
The biotechnology sector at a glance



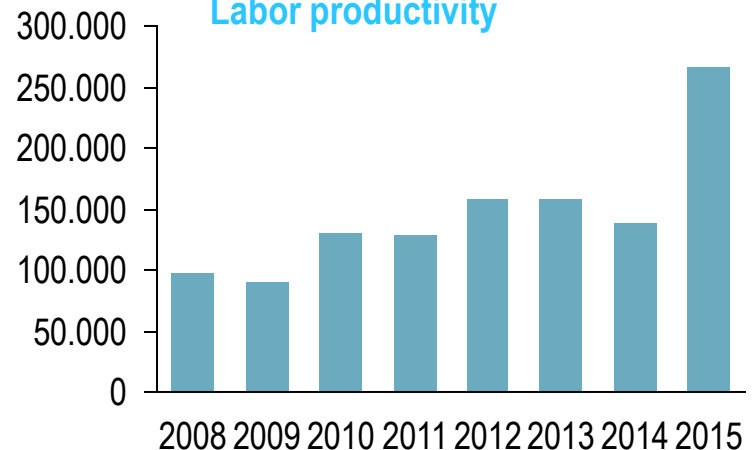
- In 2015 the biotechnology sector includes 80 companies generating over 1200 jobs in administrative, research and development areas (more than double comparatively with 2014). This indicates a high interest in the research and development of the sector
- At the same time, there was a steady growth in the number of companies following 2011
- In 2015 all 80 firms in R&D in Biotechnology enjoyed a positive turnover

Labor productivity on the rise

Labor cost (€) 2015



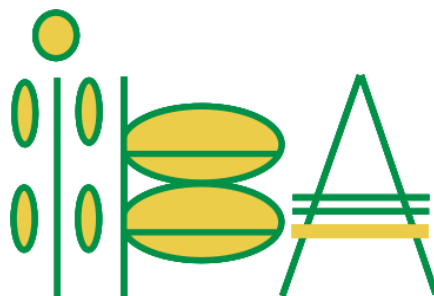
Labor productivity



- The cost of labor is very competitive, workforce is highly skilled and there is a pool of experienced management; Qualified management availability is higher than other Member States as there is a large pool of resources in biology, pharmacy, biochemistry and other fields
- In 2015-2016 there were approximately 1300 undergraduates and master students in Cluj and Bucharest alone, in engineering of biotechnical systems, medical engineering, zoo technics, medical systems and equipment and biomaterials
- Labor productivity has significantly increased since 2014, having almost doubled in 2015
- The average salary for a high-skilled employee in R&D is 7,160 euros with labor productivity reaching a significant level in 2015

BIOTEHGEN

BIOTEHGEN



The “Microbial Biotechnology Center” (BIOTEHGEN) association is an NGO providing expertise in R&D, technological transfer and consultancy in agriculture, biotechnology and environmental protection

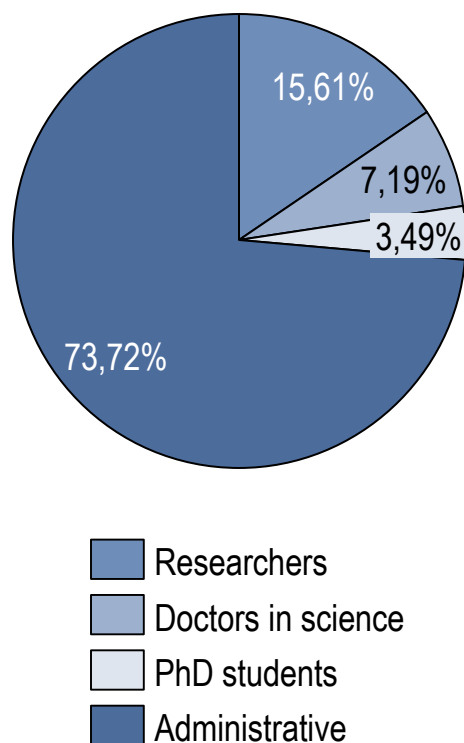
BIOTEHGEN conducts research in biochemistry, genetics, molecular biology and industrial biotechnology and has 30 employees including 25 scientists

The researchers and experts of BIOTEHGEN are involved in over 10 national and international research programs and projects (FP 6, FP 7, Leonardo da Vinci EU program and by World Bank financed programs)

They have numerous partners and collaborators, such as Pasteur Institute Bucharest, École nationale supérieure de biologie appliquée à la nutrition et à l'Alimentation (ENSBANA) France and Institute of Food Bioresources

Cantacuzino National Institute of Research-Development for Microbiology and Immunology

Employees



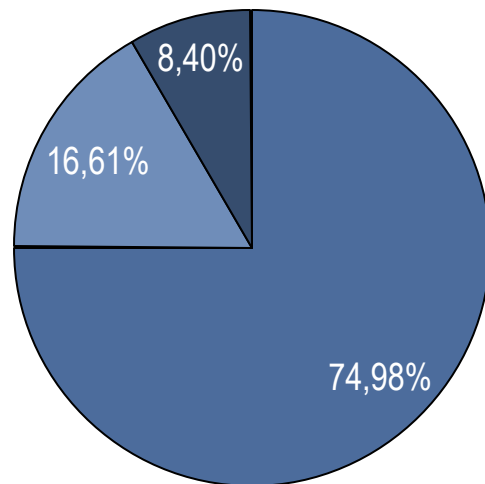
Cantacuzino National Institute is conducting scientific research in the fields of microbiology, immunology, molecular biology and genetics, education of microbiology, immunology, epidemiology, training of scientific and technical

Furthermore CNIR gives technical and methodological assistance to units in the field of sanitary network, expertise, consulting, participation in epidemiological surveillance of the territory, in national and international health programs, in accordance with specific areas

In 2014 it had a turnover of 2.3 million euros and 487 employees, out of which 76 researchers and 35 with PhD

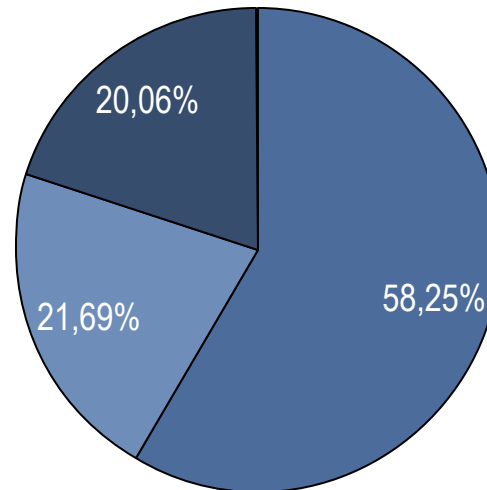
Industry main players

Turnover



Cummins Generator Technologies
 Others
 Top Companies

Net profit



The top 10 companies in biotechnology in Romania are Cummins Generator Technologies, Icon Clinical Research, Bio High Tech, Pharma Serv International, Arensia Exploratory Medicine, CIDP Biotechnology, Cosmetic Test International, Logistic Plus, RPS Romania and ICCF. They have a cumulated number of more than 1000 employees and a profit of 3 million euros

The industry turnover in 2015 was about 75 million euros and the top 10 companies in biotechnology R&D accounted for more than 80%

Cummins Generator Technologies is a UK based company that generated around 56 million euros in 2015, almost 17% of the total turnover. They were responsible for 58,6% of the annual net profit. The company manufactures premium quality alternators from 6 to 10,000kVA under the STAMFORD and AvK product brands; it has more than 730 employees.

The top 10 companies in the R&D of biotechnology account for more than 80% of the total industry turnover

Local American Working Group



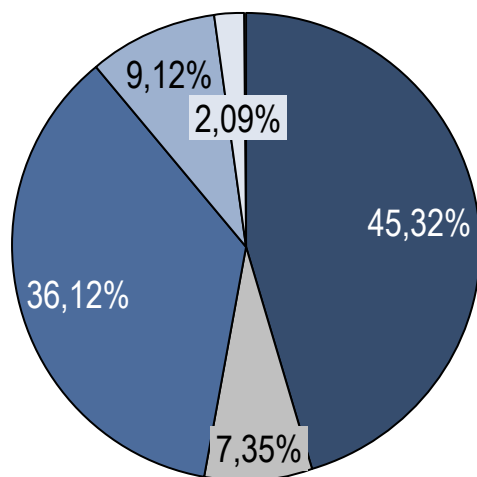
LAWG was founded in 2010 by the leading American pharmaceutical research and biotechnology companies existing in Romania

LAWG partnered with Phrma, The American Chamber of Commerce in Romania and the US Commercial Service and has 10 members: Abbvie, Amgen, AstraZeneca, Bristol-Myers Squibb, Eli Lilly, Glaxo Smith Kline, Janssen Pharmaceutical Companies of Johnson & Johnson, Merck Sharp & Dome, Novartis and Pfizer

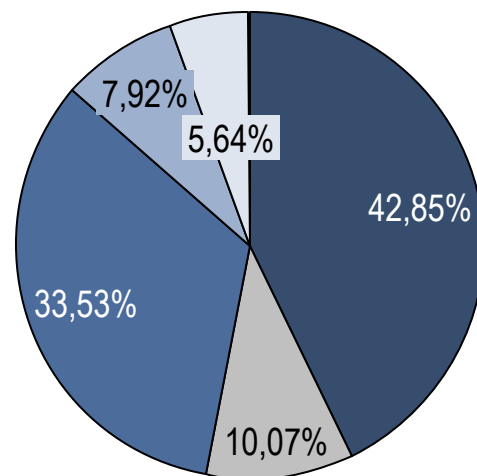
The amount invested in Romania by PhRMA member companies reaches an estimated Euro 100 million, used to power research and biopharmaceutical activities

The top 5 companies in LAWG generate 279 million euros and provide 600 jobs, being a constant source of investment in R&D

Turnover



Net profit



Pfizer
 Abbvie
 Novartis
 AstraZeneca
 Amgen

Amgen, AstraZeneca, Pfizer, Novartis Pharmaceuticals and Abbvie generated a turnover of 279,100,277 euros in 2015 and a net profit of 11,893,974 euros

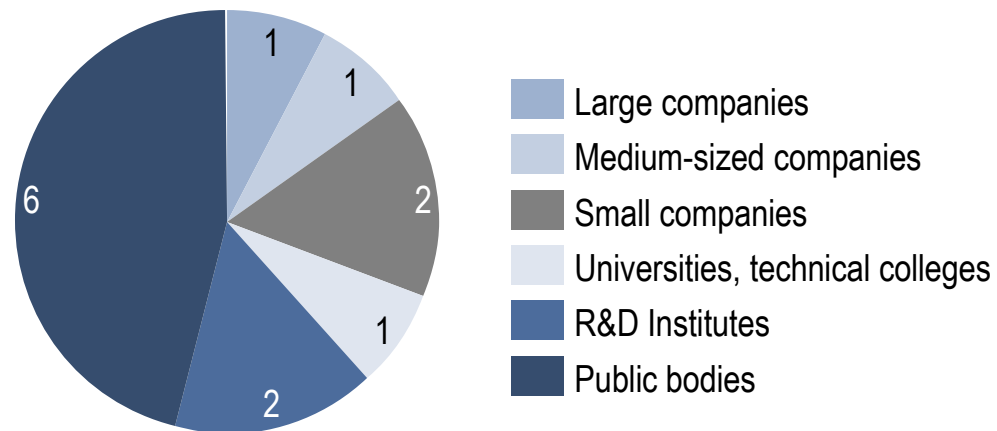
The organization has 610 employees, bring a significant contribution to the biotechnological sector and constantly investing in biopharmaceutical research and development

Company	Amgen	Astra Zeneca	Abbvie	Novartis	Pfizer
Turnover(€) 2015	5,822,912	25,462,994	20,512,451	100,823,097	126,478,823
Net profit(€) 2015	670,374	941,472	1,197,986	3,988,062	5,096,080
Employees	31	284	109	138	155

BioROne



Members



Founded in 2011, is the first bio-cluster in Romania with more than a 100 research contracts and grants and over 1000 research professionals

The cluster has 13 members which had a cumulated annual turnover of 72 million euros and 1609 employees

Members of bioROne: University of Medicine and Pharmacy "Gr.T.Popa" Iasi, Emergency Clinical Hospital "St. Spiridon", Rehabilitation Hospital, Regional Institute of Oncology Iasi, Public Health Iasi, Public Health Neamt, Institute of Forensic Medicine Iasi, Institute of Macromolecular Chemistry "Petru Poni" Iasi, National Institute of Research and Development for Technical Physics - IFT Iasi, Antibiotics SA, A & B Pharm Corporation Ltd, Romsoft Ltd and Plantavorel Ltd

Out of top 25 independent biotechnology companies listed on a stock exchange ranked by Market Capitalization, 20 of them are present in Romania





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