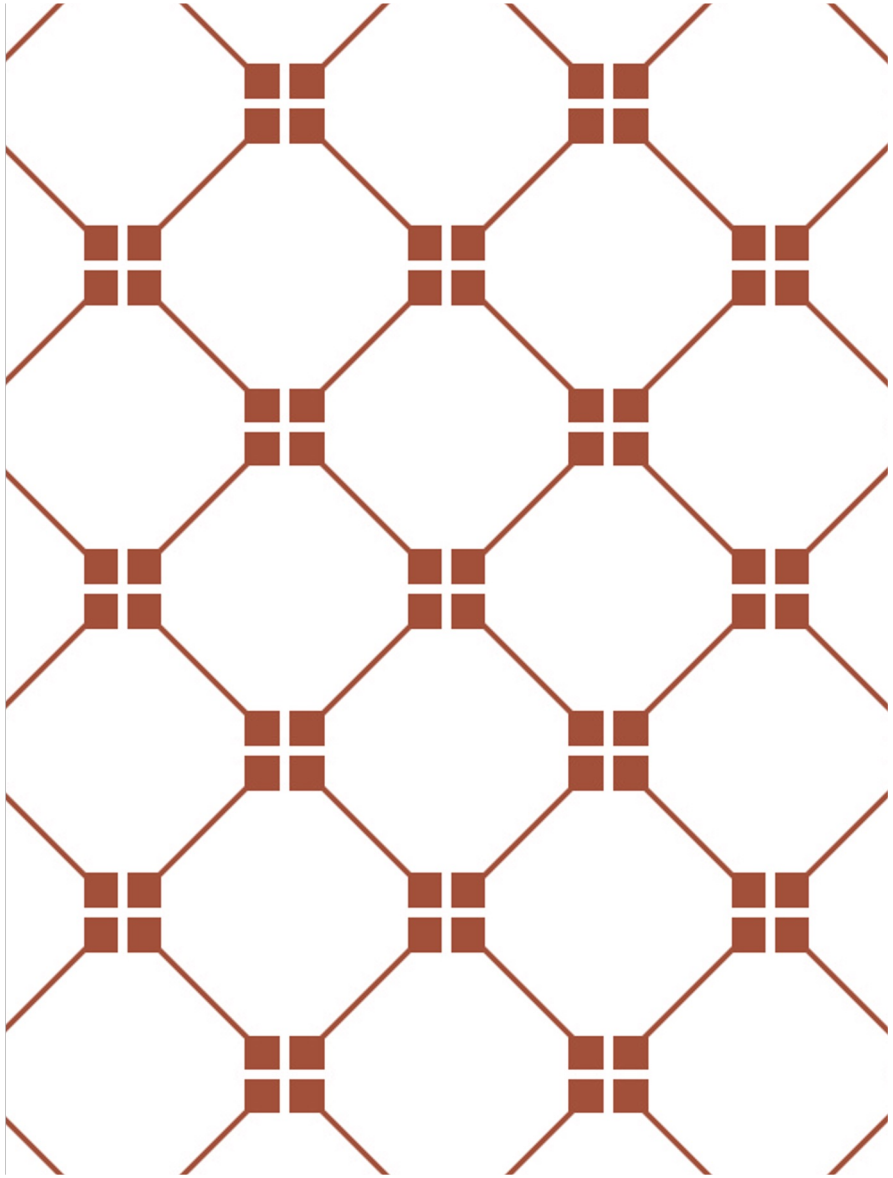

ASSESSMENT OF INVESTMENT PATTERNS AND INSTRUMENT IN THE ENERGY SECTOR

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SOURCES OF CAPITAL IN THE ROMANIAN ENERGY SECTOR

Public Funding and State Support

Private Investment;

Multilateral and Bilateral Financial Institutions

1. PUBLIC FUNDING AND STATE SUPPORT

Government subsidies and incentives have been instrumental in driving investments within the Romanian Energy Sector

These financial mechanisms, often in the form of direct financial support or tax incentives, have provided essential backing to energy projects, particularly in the renewable energy domain.

Feed-in tariffs, for instance, have guaranteed favorable electricity prices for renewable energy producers, thereby encouraging private entities to invest in solar, wind, and biomass projects

These subsidies have acted as catalysts, making clean energy ventures economically viable and attracting a wave of investments.

2. PRIVATE INVESTMENT

The Romanian Energy Sector has garnered significant attention from both domestic and international investors.

Domestic entities, including energy companies and institutional investors, have demonstrated a keen interest in leveraging their expertise to capitalize on the nation's energy potential.

Concurrently, foreign investors have been drawn by Romania's strategic location, ample resources, and commitment to energy transition.

The presence of both domestic and foreign investors has infused diversity into the sector's investment landscape, contributing to its resilience and dynamism.

3. MULTILATERAL AND BILATERAL FINANCIAL INSTITUTIONS

Multilateral and bilateral financial institutions have directed substantial funding toward renewable energy projects in Romania.

This funding, often channeled through loans, grants, or equity investments, has underpinned the development of solar and wind farms, as well as other clean energy initiatives.

These investments have not only bolstered Romania's renewable energy capacity but have also facilitated technology transfer and skill enhancement.

. The collaboration between financial institutions and local stakeholders exemplifies a synergistic approach to advancing the country's energy goals.

TYPES OF INVESTMENTS IN THE ROMANIAN ENERGY SECTOR

I. Renewable Energy

II. Conventional Energy

1. RENEWABLE ENERGY

- Wind Energy Investments
- Solar Energy Investments
- Hydropower Investments
- Biomass Investments

1. WIND ENERGY INVESTMENTS

Fântânele-Cogealac Wind Farm: This project, located in the Dobrogea region, is one of the largest onshore wind farms in Europe.

Developed by CEZ Group, it consists of 240 wind turbines with a total installed capacity of around 600 MW.

The wind farm contributes significantly to Romania's renewable energy capacity and helps reduce carbon emissions

Cernavodă Wind Farm: Located in the Constanța County, the Cernavodă Wind Farm is a joint project by Enel Green Power and Continental Wind Partners.

The wind farm comprises 32 turbines with a total capacity of 84 MW.

It showcases the collaboration between international and local players in harnessing wind energy.

2. SOLAR ENERGY INVESTMENTS

Craiova Solar Power Plant: This solar photovoltaic power plant, developed by EDP Renewables, is situated near Craiova and has an installed capacity of approximately 2.5 MW.

It contributes clean energy to the local grid and underscores the growing importance of solar investments in Romania.

Giurgiu Solar Park: The Giurgiu Solar Park, developed by ReneSola, is one of the largest photovoltaic parks in Romania.

With an installed capacity of around 45 MW, the park produces significant renewable energy and contributes to the reduction of greenhouse gas emissions.

4. BIOMASS INVESTMENTS

Suceava Biomass Power Plant: This power plant, operated by Holzindustrie Schweighofer, utilizes wood residues and sawdust to generate electricity.

With an installed capacity of around 11 MW, it exemplifies the utilization of organic waste materials for sustainable energy production.

Oradea Biomass Cogeneration Plant: The Oradea Cogeneration Plant, developed by Veolia, combines biomass and natural gas to produce both electricity and heat.

With an installed capacity of 45 MW, the plant enhances energy efficiency and contributes to reducing fossil fuel consumption.

II. CONVENTIONAL ENERGY

While renewable energy investments have gained prominence, conventional energy sources, primarily fossil fuels and nuclear energy, have also attracted investments.

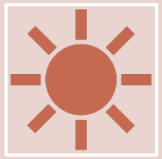
Fossil fuel investments include exploration, extraction, and processing of coal, oil, and natural gas resources.

Additionally, Romania has made investments in nuclear energy, including the Cernavoda Nuclear Power Plant.

In recent years, a notable shift has been observed in investment patterns within the conventional energy sector.

Romania, cognizant of global trends towards cleaner energy, has undertaken measures to transition from fossil fuels to more sustainable alternatives.

Investments in renewable energy infrastructure have been incentivized, leading to a reduced reliance on conventional energy sources.



The diversification of the energy mix aligns with broader environmental goals while ensuring energy security.

STATISTICAL ANALYSIS OF INVESTMENT TRENDS

Table 1. Installed capacity at SEN on 1.06.2023

Source of energy	*Groups*	*Pi license by ANRE*	*P net*	*Rpp*	*Pd*
-	*Nr.*	*[MW]*	*[MW]*	*[MW]*	*[MW]*
Coal	19	2762,20	1909,30	612,00	2151,00
Hydrocarbs	156	2867,42	2217,38	482,16	2397,21
EPA	881	6641,94	6313,27	271,80	6378,91
Nuclear	2	1413,00	1300,00	0,00	1413,00
Aeolian	115	3014,91	2966,44	23,53	2998,78
Biomass/Biogas/Others	57	138,38	126,23	4,97	133,25
Solar	630	1416,78	1332,23	82,04	1350,95
Geothermal	1	0,05	0,00	0,05	0,00
Total	1861	18254,69	16164,85	1476,56	16823,09

Source: Transelectrica SA

STATISTICAL ANALYSIS OF INVESTMENT TRENDS

Table 2. The number of prosumers connected to the distribution networks of distribution operators

Electricity distribution operator		Prosumers	Pi
-		*Nr.*	*[MW]*
DELGAZ GRID		10400	121,10
DISTRIBUTIE ENERGIE OLTENIA		13652	157,17
E - DISTRIBUTIE MUNTENIA SA		10385	139,14
E-DISTRIBUTIE BANAT		9830	117,36
E-DISTRIBUTIE DOBROGEA		5384	69,59
OMV PETROM		15	0,48
DEER MUNTENIA NORD		7559	104,76
DEER TRANSILVANIA NORD SA		9129	123,61
DEER TRANSILVANIA SUD		11284	140,03
Total		**77638**	**973,24**

Source: ANRE

STATISTICAL ANALYSIS OF INVESTMENT TRENDS

Table 3. ***Power installed at the SEN level from the energy storage source***

Index	Name	Group	Pi	Pg	Pc	E	Company
		Nr.	[MW]	[MW]	[MW]	[MWh]	
1	MEGALODON IS	1	7	7	7	6	MEGALODON STOR
2	ARAD	1	1	1	1	0,5	AOT ENERGY
3	ARAD	2	1	1	1	0,5	AOT ENERGY
4	COBADIN 1	1	1,2	1	1	1	EDPR ROMÂNIA (fosta IALOM
5	FANTANELE EST	1	0,85	0,85	0,85	0,85	TOMIS TEAM
6	FANTANELE VEST	1	2,625	2,625	2,625	2,625	TOMIS TEAM
7	COGEALAC	1	2,525	2,525	2,525	2,525	OVIDIU DEVELOPME
	Total	**7**	**16,2**	**16,2**	**16,2**	**14**	

Source: ANRE

STATISTICAL ANALYSIS OF INVESTMENT TRENDS

Table 4. ***The total production capacity installed and available in SEN***

National Power Data (net values in **GW**)		**2023**	
		January	**July**
Net Generating Capacity per Primary Energy Source			
1	Nuclear Power	**1,300**	**1,300**
2	Fossil Fuels	**4,545**	**4,127**
2A	Lignite	2,374	1,733
2B	Hard Coal	0,176	0,176
2C	Gas	1,330	1,330
2D	Oil	0,000	0,000
2E	Mixed Fuels	0,665	0,888
3	Renewable Energy Sources (other than hydro)	**4,400**	**4,425**
3A	Wind Power	2,966	2,966
3B	Solar Power	1,307	1,332
3C	Biomass	0,126	0,126
4	Hydro power	**6,313**	**6,313**
4A	of which renewable hydro generation	6,313	6,313
4B	Pumped-Storage Water	0,000	0,000
5	**Net Generating Capacity**	**16,558**	**16,165**

Source: ANRE

STATISTICAL ANALYSIS OF INVESTMENT TRENDS

Table 5. Investments made by the distributers between 2014 and 2022

Operator de distribuție /Anul calendaristic	2014	2015	2016	2017	2018	2019	2020	2021	2022
Enel Distributie Muntenia	128,082,288	113,499,712	121,515,165	160,050,433	232,815,910	221,172,629	236,063,262	250,612,292	228,793,825
Enel Distributie Banat	51,276,020	61,480,201	72,527,100	90,995,216	120,278,057	127,897,984	112,951,320	147,065,187	134,637,268
Enel Distributie Dobrogea	45,735,712	51,177,060	64,758,605	80,822,241	123,184,177	118,815,617	103,657,777	115,664,583	125,796,794
Distributie Energie Oltenia	154,345,111	153,635,608	160,164,667	168,010,091	166,337,716	172,192,971	180,976,983	213,226,169	186,771,496
Delgaz Grid	149,696,581	156,971,440	134,340,990	158,004,827	163,528,776	135,597,315	134,291,345	227,931,227	191,129,457
DEER Muntenia Nord	119,831,000	121,626,826	145,424,110	223,765,451	278,767,140	188,340,294	188,666,446	150,667,816	127,849,471
DEER Transilvania Nord	97,458,683	178,626,209	232,019,458	240,557,842	287,359,500	180,312,002	171,746,286	167,785,288	165,184,194
DEER Transilvania Sud	106,733,238	153,901,090	136,391,719	231,919,005	228,417,328	239,681,301	179,847,272	155,248,665	134,050,795
Total investiții	**853,158,633**	**990,918,146**	**1,067,141,814**	**1,354,125,107**	**1,600,688,603**	**1,384,010,113**	**1,308,200,690**	**1,428,201,226**	**1,294,213,300**

Source: ANRE

ANTICIPATED SHIFTS IN INVESTMENT PATTERNS

Continued Emphasis on Renewable Energy: The trend towards renewable energy investments is poised to persist, driven by both regulatory mandates and market dynamics. Investments in wind, solar, and biomass projects are likely to maintain their prominence.

Diversification of Renewable Portfolio: Investors may increasingly explore niche renewable sectors, such as geothermal and marine energy. These technologies, while still nascent, offer untapped potential and align with the broader goal of diversifying the energy mix.

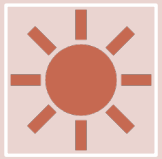
Technology and Innovation: Advancements in energy technologies, including energy storage, smart grids, and digitalization, will attract investments aimed at enhancing energy efficiency, grid management, and consumer empowerment.

Circular Economy and Sustainability: Investments that align with circular economy principles, such as waste-to-energy projects and sustainable supply chains, will gain traction as environmental considerations take center stage.

CONCLUSIONS

A comprehensive analysis of historical investment trends, sources of capital, and types of investments in the Romanian Energy Sector reveals a dynamic and evolving landscape. The sector's journey over the past two decades underscores the intricate interplay between government policies, market forces, and technological innovations.

Looking ahead, the future of the Romanian Energy Sector is poised for continued transformation. Emerging investment opportunities in energy storage, electric mobility, and energy efficiency signal a shift towards a more sustainable and diversified energy ecosystem.



As Romania navigates these opportunities and challenges, stakeholders are presented with a unique juncture to shape the sector's trajectory. Informed by historical insights, the sector can chart a course towards energy security, economic prosperity, and environmental stewardship.

THANK YOU FOR YOUR ATTENTION!