



S.N. Nuclearelectrica S.A.

Presentation for investors



Commitment for excellence

Action for results



SNN, IN BRIEF

SNN, IN BRIEF

- Societatea Nationala Nuclearelectrica S.A. ("Company" or "SNN") is a national joint-stock company, managed in a one-tier management system, with its registered office in Bucharest, District 1, 65 Polona Street, and two branches without legal personality. The company's main activity is the "Production of electricity" – NACE code 3511, and it is recorded in the Trade Register under no. J40/7403/1998, tax number 10874881, fiscal attribute RO.
- At present, SNN is the only producer of electricity based on nuclear technology in Romania.
- Also, SNN produces nuclear fuel bundles, CANDU type, used for the operation of its own nuclear reactors. NPP branch (Nuclear - Power Plant) Cernavoda, with registered office in Cernavoda, 2 Medgidiei Street, registered with the Trade Register under no. J13/3442/11.10.2007, ensures the operation of the two nuclear units, based on CANDU technology type, as well as the administration of all SNN assets in Cernavoda (except for Units 1 and 2 in operation, Units 3 and 4 in different construction stages, Unit 5 for which the shareholders of the Company had approved the change of destination since March 2014, namely, its use for carrying out activities related to the operation of Units 1 and 2, and also the heating system). The two units have an installed capacity around 700 MW (MWe 706.5 Unit 1 and MWe 704.8 MWe Unit 2).
- NFP Branch (Nuclear Fuel Plant) Pitesti, with registered office in Mioveni, 1 Campului Street, registered with the Trade Register under no. J03/457/August 24, 1998, where CANDU fuel bundles are made for Units 1 and 2 of Cernavoda. Unit 1 was commissioned in 1996 and Unit 2 in 2007. The two reactors alone ensure about 17% - 18% of the internal energy production of Romania. The nuclear reactors from the two units are 6 CANDU type, design developed in Canada, by Atomic Energy of Canada Ltd. This type of reactors are cooled and moderated with heavy water and use natural uranium as fuel. The initial project envisages the construction of 5 nuclear units CANDU type.



Our mission

Capitalization of nuclear resources for producing clean energy under conditions of safety and economic efficiency.



Among its characteristics:

- A high value of the installed capacity factor; at an equal installed capacity factor, a nuclear unit produces twice as much energy as a conventional unit;
- No greenhouse gas emissions
- Low dependency of the price per KW on the variation of uranium prices, due to its small quota in the production cost as compared to other energy producers
- High technical level of the operation personnel,
- Reasonable production costs
- Nuclear power fully complies with the requirements regarding security of supply, sustainable development and competitiveness.

Our vision

High-performance, innovative national company, determined to obtain excellent and sustainable results, in the top rankings of nuclear energy.

Our values

Responsibility

Teamwork

Integrity

Mutual respect

Professional excellence

Continuous improvement

Slogan

Commitment to excellence. Action for results.



Shareholding structure

The shareholding structure as of December 31, 2020 and December 31, 2019 is as follows:

Shareholders	Number of shares December 31, 2020	% of the share capital	Number of shares December 31, 2019	% of the share capital
Romanian State - Ministry of Energy ^{*)}	248,850,476	82.4981%	248,736,619	82.4959%
Fondul Proprietatea S.A.	-	-	21,268,355	7.0539%
Other shareholders	52,793,418	17.5019%	31,508,877	10.4502%
Total	301,643,894	100%	301,513,851	100%

The last share capital increase took place in 2020 by subscribing 130,043 new shares, in value of RON 1,300,430, representing the in-kind contribution of the Romanian State, represented by the Ministry of Economy, Energy and Business Environment, and the cash contribution of the Company shareholders. The share capital increase was performed according to the Proportional Offer Prospectus related to share capital increases, approved by Resolution of the Financial Supervision Authority no. 976/13.08.2020 and Resolutions no. 2/04.01.2019 and no. 12/19.12.2019 of the Extraordinary General Assembly of Shareholders, registered with the Trade Register National Office according to Mention Certificate no. 484154/30.09.2020.

**) Starting with February 11, 2020, the shares held by the Romanian State via the Ministry of Energy are transferred to the Romanian State via the Ministry of Economy, Energy and Business Environment, as a result of the implementation of the provisions of the Government Emergency Ordinance no. 68/November 06, 2019.*

The holders of ordinary shares are entitled to receive dividends, as they are reported from time to time, and one vote per share at the General Meetings of Shareholders.

Elements of general assessment

SN Nuclearelectrica SA (“SNN”) announces that it has published, in compliance with the financial calendar for 2021, the preliminary and unaudited individual financial statements for the financial year ended December 31, 2020.

SNN registered a net profit of 684,709 thousand lei, an increase of 27.8% compared to 2019, an increase of 3.4% of the operating income. EBITDA increased by 10.6% and EBIT by 21.8% compared to 2019 results.

Indicator*) [thousand RON]	Period of 12 months ended on December 31, 2020 (unaudited)	Period of 12 months ended on December 31, 2019 (audited)	Variatio n
Production (GWh)**)	10.558	10.347	2,0%
Operating revenues, out of which:	2.500.172	2.417.433	3,4%
Sales of electricity***)	2.432.279	2.365.564	2,8%
Operating expenses, less depreciation and amortization	(1.188.996)	(1.232.455)	(3,5%)
EBITDA	1.311.176	1.184.978	10,6%
Depreciation and amortization	(544.752)	(555.553)	(1,9%)
EBIT	766.424	629.425	21,8%
Financial revenues	84.530	67.337	25,5%
Financial expenses	(40.513)	(65.487)	(38,1%)
Income tax expense, net	(125.732)	(95.608)	31,5%
Net profit	684.709	535.667	27,8%

“Although 2020 was a difficult year, the SNN team maintained its initial strategy of financial growth, but especially continuation of current and strategic investment projects, refurbishment of Unit 1 and the Project of Units 3 and 4. We have constantly ensured the workforce to maintain the vital functions of nuclear safety, the efficient operation as well as the support functions, we continued the company’s internal projects in the area of recruitment and retention of highly qualified personnel and innovation by analyzing various new business opportunities: small modular reactors, production of Cobalt 60, pure hydrogen. On the capital market, we considered the inclusion of SNN in the London FTSE Russell market indexes starting with September 2020 a positive signal, with maturation effect both for the local stock exchange and for SNN shares. In 2020, we relied on the previously acquired resilience and we wanted to give a signal of trust and efficient management of the company, in a difficult national and international context, for our shareholders and investors. ” - Cosmin Ghita, CEO

	Note	December 31, 2020 (unaudited)	December 31, 2019 (audited, restated)	January 1, 2019 (audited, restated)
Assets				
Non-current assets				
Property, plant and equipment	4	5,794,727,840	6,056,697,319	6,364,461,135
Assets representing rights of use underlying assets under a leasing contract		621,233	-	-
Intangible assets		53,470,674	60,760,656	54,834,052
Financial assets at amortised cost	2c/5	5,056,031	42,836,031	110,474,559
Financial investments in subsidiaries	2c/6	141,666,101	141,666,101	141,666,101
Total non-current assets		5,995,541,879	6,301,960,107	6,671,435,847
Current assets				
Inventories	2c/7	435,434,531	402,936,159	368,742,400
Assets classified as held for sale	2c/8	2,231,633	2,231,633	-
Trade receivables	2c	157,943,751	169,994,236	157,665,341
Other financial assets at amortised cost	2c	85,367,796	81,706,755	36,230,570
Bank deposits	9	1,621,384,000	58,879,494	20,954,979
Cash and cash equivalents	9	546,565,840	1,793,145,389	1,611,175,766
Total current assets		2,848,927,551	2,508,893,666	2,194,769,056
Total assets		8,844,469,430	8,810,853,773	8,866,204,903
Equity and liabilities				
Equity				
Share capital, out of which:		3,211,941,683	3,210,641,253	3,210,641,253
<i>Subscribed and paid in share capital</i>		<i>3,016,438,940</i>	<i>3,015,138,510</i>	<i>3,015,138,510</i>
<i>Inflation adjustments to the share capital</i>		<i>195,502,743</i>	<i>195,502,743</i>	<i>195,502,743</i>
Share premium		31,474,149	31,474,149	31,474,149
Prepaid share reserve		21,553,537	21,553,537	21,553,537
Revaluation reserve		198,799,898	227,996,066	257,407,532
Retained earnings		4,047,171,291	3,843,269,056	3,658,054,141
Total shareholder's equity	10	7,510,940,558	7,334,934,061	7,179,130,612
Liabilities				
Non-current liabilities				
Long term borrowings		290,478,567	499,908,597	683,967,469
Long term lease liabilities		515,074	-	-
Provisions for risks and expenses	11	235,409,546	213,470,997	182,883,283
Deferred revenues		86,067,969	100,412,631	114,757,293
Deferred tax liability		66,526,912	80,743,008	102,644,715
Employee benefit obligations		43,102,434	41,621,644	38,617,348
Total non-current liabilities		722,100,502	936,156,877	1,122,870,108
Current liabilities				
Trade and other payables		285,020,150	220,236,112	197,107,880
Short term lease liabilities		117,721	-	-
Current portion of provisions for risks and expenses	11	57,272,874	65,442,649	33,831,052
Current tax liability		40,794,089	13,329,182	98,958,158
Deferred revenues		16,228,454	27,863,600	30,913,233
Current portion of long term borrowings		211,995,082	212,891,292	203,393,860
Total current liabilities		611,428,370	539,762,835	564,204,183
Total liabilities		1,333,528,872	1,475,919,712	1,687,074,291
Total equity and liabilities		8,844,469,430	8,810,853,773	8,866,204,903

	Note	2020 (unaudited)	2019 (audited)
Revenues			
Sales of electricity	12	2,432,279,475	2,365,563,574
Electricity transmission revenues		13,724,548	12,208,626
Total revenues		2,446,004,023	2,377,772,200
Other income		54,167,930	39,660,952
Operational expenses			
Depreciation and amortisation		(544,752,111)	(555,552,520)
Personnel expenses		(440,280,607)	(425,597,378)
Cost of traded electricity		(56,596,319)	(84,160,189)
Repairs and maintenance		(66,177,703)	(63,139,508)
Electricity transmission expenses		(13,724,548)	(12,208,626)
Cost of spare parts		(15,356,809)	(16,311,993)
Cost of nuclear fuel		(132,766,256)	(106,122,681)
Other operating expenses	13	(464,093,160)	(524,914,494)
Total operating expenses		(1,733,747,513)	(1,788,007,389)
Operating profit		766,424,440	629,425,763
Finance costs		(40,513,514)	(65,486,790)
Finance income		84,530,211	67,336,735
Financial result	14	44,016,697	1,849,945
Profit before profit tax		810,441,137	631,275,708
Net income tax expense		(125,731,788)	(95,608,444)
Net profit		684,709,349	535,667,264

As of December 31, 2020, the Company records in the “Financial investments in subsidiaries” position its investment in subsidiary - Energonuclear S.A. (“Energonuclear”), a company with the main office in Bucharest, District 2, no. 5-7, Vasile Lascar Street, 3 Floor, and is recorded in the Trade Register under number J40/3999/25.03.2009, sole registration number 25344972 and fiscal attribute RO. The main business of Energonuclear consists in “Engineering activities and technical consultancy related to it” – NACE Code 7112. As at December 31, 2020 and December 31, 2019, the Company owns 100% of the share capital of Energonuclear. The value of the interest on December 31, 2020 and December 31, 2019 amounts to RON 141,666,101.

As at December 31, 2020 and December 31, 2019, the inventories are as follows:

	December 31, 2020 (unaudited)	December 31, 2019 (audited, restated)
Spare parts	142,358,860	135,934,178
Consumables and other materials	48,231,895	48,185,789
Nuclear fuel	193,639,358	158,829,051
Uranium	39,292,794	55,554,976
Other inventories	11,911,624	4,432,165
Total	435,434,531	402,936,159

Raw materials, spare parts and other inventory are recognized on expenses when consumed. The value of inventory recognized as the expenditure in 2020 can be found under the headings "Expenses with spare parts" and "Cost of nuclear fuel" in the profit and loss account and other elements of the comprehensive income.

The Company periodically analyzes the evolution of inventories, and sets up in due time impairment adjustments for the inventories considered as impaired. Consequently, for decommissioned inventories, the Company has set up impairment adjustments, which it restated as revenues when it decommissioned them. The value of the inventory impairment adjustments as of December 31, 2020 is RON 51,834,621 (December 31, 2019: RON 52,788,117). In 2020, the Company recorded inventory impairment adjustment expenses in value of RON 815,027 (2019: RON 555,693) and restated as revenues inventory impairment adjustments of RON 2,057,761 (2019: RON 1,812,090). In 2020, the Company did not record decommissioned inventory restatements. As of December 31, 2020, the Company does not record pledged or mortgaged inventories.

1. ASSETS CLASSIFIED AS HELD FOR SALE

	December 31, 2020 (unaudited)	December 31, 2019 (audited, restated)
Land	120,740	120,740
Constructions	1,823,567	1,823,567
Fittings and plants	287,326	287,326
Total	2,231,633	2,231,633

In 2019, by Resolution of the Ordinary General Assembly of Shareholders no. 5/23.04.2019, the Company approved the sale of the asset “Hostel for single people”, owned by the Company, located in Constanta County, Cernavoda City, no. 14, Salciei Street, composed of: building, related land, installations for connecting to the district heating network, parking lot fittings, sports field and green areas.

On December 31, 2020 and December 31, 2019, the cash and cash equivalents are as follows:

	December 31, 2020 (unaudited)	December 31, 2019 (audited)
Bank deposits shorter than 3 months	425,556,000	1,604,778,300
Cash at bank in RON	119,176,581	162,296,965
Cash at bank in foreign currency	1,741,506	25,937,012
Cash on hand	91,753	133,112
Total cash and cash equivalents	546,565,840	1,793,145,389

On December 31, 2020 and December 31, 2019, the bank deposits with original maturities longer than 3 months and shorter than one year are as follows:

	December 31, 2020 (unaudited)	December 31, 2019 (audited)
Bank deposits	1,621,384,000	58,879,494
Total bank deposits	1,621,384,000	58,879,494

Bank deposits are permanently at the disposal of the Company and are not restricted or encumbered by charges.

PROVISIONS FOR RISKS AND EXPENSES (CONTINUED)

On December 31, 2020, the provisions in total amount of RON 292,682,420 represent short – term and long - term liabilities, as follows:

	Short - term portion (< 1 year)	Long term portion (> 1 year)
Obligations regarding the Intermediary Used Fuel Storage (DICA)	26,596,716	43,665,672
Obligations regarding the low and medium radioactive and non-radioactive waste	9,349,710	94,534,615
Salary increase litigation provision	-	97,209,259
Employees' participation to the profit	21,326,448	-
Total	57,272,874	235,409,546

“Salary increase litigation provision” position represents the forecast of the effects of litigations initiated by Unions against the Company, CNE Cernavoda Union and Sindicatul Liber Energetica Nucleara '90 Union, with regard to the allowance for nuclear risk, as a salary increase.

1. SALES OF ELECTRICITY

Revenues from electricity sales	2020 (unaudited)	2019 (audited)
Sales of electricity on regulated market	404,796,955	259,323,436
Sales of electricity on free market	2,021,681,916	2,099,883,595
Sales of thermal energy	5,773,558	6,329,627
Revenues from green certificates	27,046	26,916
Total	2,432,279,475	2,365,563,574

The amount of energy sold	2020 (unaudited)	2019 (audited)
Quantity of electricity sold on regulated market (MWh)	2,181,607	1,376,963
Quantity of electricity sold on free market (MWh)	8,589,781	9,245,123
Total	10,771,388	10,622,086

The Company is a participant in the balancing market, according to the agreement of participation in the balancing market concluded with C.N. Transelectrica S.A. and set up a security in the amount of RON 50,000, valid until June 22, 2021 and is a member of PRE Ciga Energy SA, in virtue of the contract concluded with Ciga Energy S.A. for providing the representation service as a party in charge of balancing (PRE), in reference to which it set up securities amounting to RON 1,450,000, valid until December 20, 2021.

The presented quantity of energy does not include the quantity of energy corresponding to the income from positive unbalances valued on the Balancing Market, amounting to 33,757 MWh for the fiscal year that ended on December 31, 2020 (30,137 MWh for the year that ended on December 31, 2019).

OTHER OPERATING EXPENSES

	2020 (unaudited)	2019 (audited)
Expenses with third parties services	87,501,426	89,758,160
Expenses with ANDR	102,246,544	98,249,692
Energy and water expenses	80,009,660	79,490,421
Fuel and other consumables expenses	50,103,743	42,147,140
Expenses with ANRE contribution	9,195,138	42,501,390
Costs of insurance premiums	12,530,425	12,701,686
Transport and telecommunication expenses	7,271,177	8,727,006
Tax on buildings expenses	63,230,788	55,838,095
Expenses related to provisions and impairments, net	5,236,830	55,123,571
Other operating expenses	46,767,429	40,377,333
Total	464,093,160	524,914,494

Expenses with ANDR

Starting with 2007, following the Government Decision no. 1080/05.09.2007 regarding the safe management of the radioactive waste and the decommissioning of the nuclear installations, the Company is required to make two types of contributions to the ANDR:

- contribution for the decommissioning of each nuclear unit amounting to 0.6 EUR/MWh of net electricity generated and delivered in the system;
- contribution for the permanent storage of radioactive waste of 1.4 EUR/MWh of net electricity produced and generated and delivered in the system.

According to this legislative act, the annual contribution for decommissioning is paid over the projected useful life of both nuclear units, and the direct annual contribution for permanent storage is paid over the operational period of the nuclear units and consequently, ANDR takes responsibility for managing the entire decommissioning process at the end of the useful life of the nuclear plants and the storage of resulting waste.





Decommissioning

In accordance with Government Decision no. 1080/2007, and Radioactive Waste Nuclear Agency("ANDR") is responsible for collecting and managing the contributions made by the SNN for the dismantling of the two units and for disposal of radioactive waste generated in the operation and decommissioning of units.

In 2008 - 2019, SNN paid on an annual basis the following contributions to ANDR:

- (a) Contributions for the decommissioning of each nuclear reactor in amount of 0.6 EUR/MWh of produced and delivered electricity in SEN;
- (b) Contributions for the final storage of radioactive waste, in amount of 1.4 EUR/MWh of produced and delivered electricity in SEN.

Activity of SNN at BSE

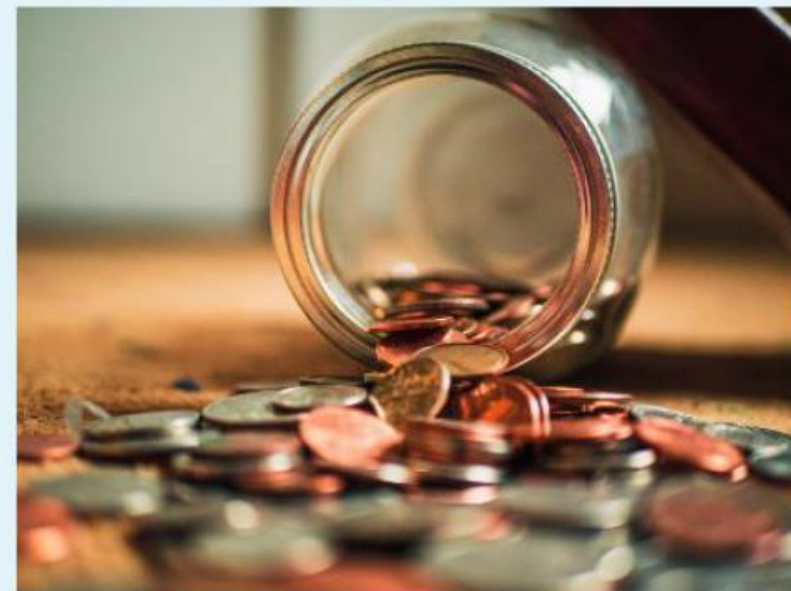


Evolution of SNN shares

XII. DIVIDEND POLICY

SNN is a national company with a majority state capital. Thus, the allocation of the net profit complies with the provisions of Government Ordinance no. 64/2001 ("GO 64/2001") regarding the profit distribution in national entities, national companies and companies with total or majority state capital, and autonomous administrations, as further amended and supplemented. Thus, according to the provisions of GO no. 64/2001, the minimum dividend distribution share is 50% of the net profit remained after the distributions provided under art. 1 par. (1) let. a)-e) from O.G. no. 64/2001. The legislative framework could be amended in the future by amending the legislation in force, so that the minimum dividend distribution share would be changed.

The provisions of GO 64/2001 establish a minimum mandatory dividend distribution share. Thus, as long as the provisions of GO 64/2001 remain unchanged, the Company may propose to the shareholders a dividend distribution share between 50% and 100% of the distributable profit. The profit share to be distributed annually by the Company in the form of dividends is subject to approval within the General Meeting of Shareholders. Thus, SNN registers and pays dividends distributed from the net profit, only after the approval of the annual financial statements by the General Meeting of Shareholders and the profit distribution proposal.



The due dividends and payments, respectively, during the last 3 years were as follows:

Indicator [lei]	2019 ²	2018	2017
Retreated net profit ¹⁾ (a)	-	-	306,542,912
Effect of correcting accounting errors (b)	-	-	(2,666,644)
Net profit (c) = (a) + (b)	535,667,264	410,611,215	303,876,268
Distribution to the legal reserve (d)	(31,563,785)	(28,631,164)	(17,845,334)
Other reserves representing tax facilities stipulated by law (e)	(5,682,083)	(3,065,741)	(7,721,372)
Net profit distributable to the dividend (f) = (c) + (d) + (e)	498,421,396	378,914,310	278,309,562
Employees' participation in the profit (g)	(18,700,000)	(16,000,000)	(13,265,000)
Net profit calculation base, dividend distribution (h) = (f) - (g)	517,121,396	394,914,310	291,574,562
Proposed dividends (i)	498,421,396	378,914,310	271,362,466
Allocated dividends	498,421,396	378,914,310	271,362,466
Additionally distributed dividends ³⁾	-	-	485,437,300
Dividends paid until 31.12.2019	-	378,696,423	756,418,732
Profit distribution rate (%) = (i)/(h)	96.38%	95.95%	93.07%
Profit distribution rate ² (%) = (i)/(f)	100.00%	100.00%	97.50%

Corporate Social Responsibility and Sponsorships

The situation of the sponsorships can be found at: <https://www.nuclearelectrica.ro/ir/periodic-reports/?lang=en>

2020 sponsorship program 2020 in numbers

33 initiated campaigns

11 sponsorships in the medical field

4 sponsorships in the social field

9 sponsorships in the educational field

3 sponsorships in the cultural field

5 sponsorships in other fields

RON 9,837,822.39 consumed budget

2,417,466 Romanians benefitted from the CSR and sponsorship program of SNN

Societatea Nationala Nuclearelectrica SA ("SNN") deems as important the involvement in supporting activities carried out by non-governmental associations, non-profit organizations or eligible institutions in virtue of the applicable legislation, which have beneficial effects on a significant number of people. According to the corporate social responsibility statement of SNN, published on the website of the company, the activities supported by SNN are, predominantly, those related to the energy field, and also those related to the active participation in organizations that promote nuclear energy, sustainable public policies in the economic and energy field, such as professional or academic associations involved in the promotion of culture and education.

According to the provisions of the corporate social responsibility statement, in 2020, the activities supported by SNN by granting sponsorships were mainly those related to the medical field, considering the SARS-COV-2 pandemic, and also those related to the energy field, those related to supporting and promoting youth, culture and education, scientific and artistic activities, and those related to the national patrimony, humanitarian activities, and helping children in need. According to the strategic directions adopted by the managers of the company, SNN extended its charity program in order to be able to respond to the punctual requests received from various organizations, which corresponded with the objectives and interests of SNN, with projects with major and durable impact in social areas that required investments. After receiving sponsorship requests from non-governmental and institutional organizations and after analyzing them on the executive level of SNN, in 2020 the Board of Directors of SNN approved the granting of 33 sponsorships, which fitted into the Budget of Revenues and Expenses of SNN for 2020. Considering the epidemiological context of our country in 2020, most of the projects sponsored by SNN were in the medical and educational fields, by fitting hospital units with the necessary equipment and devices for stopping the spread of the Sars-COV-2 virus and for supporting online remote education.

All 33 sponsorships granted by SNN in 2020 had 2,417,466 beneficiaries. They were in the following categories:

- Medical: 11 sponsorships
- Social: 4 sponsorships
- Educational: 9 sponsorships
- Cultural: 3 sponsorships:
- Other sponsorships: 5 sponsorships.

According to the Budget of Revenues and Expenses approved for 2020, by Resolution of the Ordinary General Assembly of Shareholders of SNN no. 3/March 05, 2020, the budget allocated to sponsorship expenses was RON 10,000,000. In total, from the amount budgeted for sponsorships for 2020, of RON 10,000,000, the amount of RON 9,837,822.39 was spent, the equivalent value of a budget implementation of 98.37%. All the sponsorships granted by SNN in 2020 can be deducted from the profit tax payable by the company.

All the projects financed by SNN benefitted from media exposure on the main mass communication channels, and on social media. SNN was promoted as a party involved in these projects by interviews and press articles, publishing information on the websites of the sponsorship beneficiaries and on their social media channels (Facebook, LinkedIn), featuring the SNN brand on the equipment and products purchased by the sponsorships, posting the sponsorship information at the premises of the beneficiary institution and at the events financed by the company. Considering that a significant part of the sponsorship contracts concluded between SNN and the beneficiaries are still in progress, the actions of promoting SNN as a financing party will continue in 2021, until the expiry of the contractual period.

X. INTERNATIONAL RELATIONS

The nuclear industry is especially through the fact that inside it, there is a continuous flow of experience and information exchange. Each operator of Nuclear Plants is part of an international network of approximately 440 Nuclear Units globally. At international level, the leader in international cooperation, in the nuclear field, is the World Association of Nuclear Operators ("WANO"), and at the government level, the International Agency for Atomic Energy from Vienna ("IAEA"). The purpose for the development of this international cooperation network is the analysis of different event categories and the dissemination of lessons learned in order to eliminate recurrence, promoting experiences and optimum practices adopted and implemented internationally, benchmarking and evaluation of implementing standards at international level, control and monitoring of performance indicators and updating them to keep a constant high level of nuclear security, organizing inter-plant evaluation missions for ensuring the adherence and for each operator of Nuclear plants to adopt the best practices at international level and evaluated through de facto performance. Therefore, at the nuclear industry level, it is created what is called the "inter-plant pressure", element which determines keeping certain high security nuclear standards. In general, the international cooperation programs, mainly in the technical operating area, are divided in four distinctive categories: international evaluation missions, experience in operation, technical support and, implicitly, exchange of information and experience, continuous technical and professional development. All information categories and data resulted following the development of these programs are disseminated to all members, within the international system.

SNN pays particular attention to safe operation of nuclear facilities which it operates, to equipment reliability, increased performance in operation, exchange of experience, with direct results on employee performance, involvement in building political support and development programs related to integrated development of the company. Therefore, according to the practice at international level, SNN is an active member in a series of international organizations, with different areas of applicability, from nuclear security, radioprotection, management of radioactive waste up to procurement, financial benchmarking, international law. Depending on their specificity, these organizations can have a regulation and inspection nature for its members in order to improve their performance (e.g. World Association of Nuclear Operators - WANO) or consultative, participatory and inter-sharing of knowledge character, participation in joint projects as an effective mechanism to reduce research and purchase equipment costs.



SNN is affiliated with a number of organizations both at European and international level in order to benefit from the operational experience available in their participation in decision-making processes that may affect European policy and global alignment of nuclear safety standards imposed by CNCAN, recognition of results, among which we mention:

- **World Association of Nuclear Operators (WANO):** represents the association of all owners of Nuclear Power Plants in the world, founded in 1989. SNN has been a member of Atlanta Regional Center since 1991. In 2011 it became a member of London Coordination Centre. WANO membership guarantees: participation in assessment missions, exchange of experience in operating, technical support, technical and professional development. The WANO membership facilitates the information exchange in the field of exploitation experience of Nuclear Plants, therefore WANO members working together for reaching the highest standards in the field of Nuclear Plants exploitation under high nuclear and reliability security standards. Through WANO, all Nuclear Plant holders may communicate and exchange information between them, openly and cooperatively. This working method allows each WANO member to benefit and learn from the experience of other members, to get in line with the best practices global practices in the field, all with the final purpose of increasing the security degree in exploiting the Nuclear Plants they own.
- **Candu Owners Group (COG):** represents a private international non-profit organization, which includes organizations from Canada (AECL, Ontario Power Generation, NB Power, Bruce Power Generation, Hydro Quebec), Argentina, China, India, Korea, Pakistan and Romania. Within COG, SNN participates to the basic program Information Exchange (IE), Research and Development Program (R&D), Nuclear and Environment Safety Program (Nuclear Safety & Environmental Affairs NSEA), Joint Projects Program (Joint Projects - JP). The COG activity is generally focused on a regulation, research, maintenance, development, technical assistance and information exchange program between its members.
- **The International Agency for Atomic Energy (IAEA):** serves as inter-government world forum for the scientific and technical cooperation in the nuclear field. IAEA encourages the use of atomic energy by the signatory states, offering them the necessary technical assistance and providing them experts in the field, respectively the necessary logistic base. Romania is a founding member of IAEA.

NEA OECD: Romania has joined the Nuclear Energy Agency (NEA) within the Organization for Economic Cooperation and Development (OECD) in June 2017. NEA represents the intergovernmental agency that facilitates the cooperation between the countries that use nuclear technology and aim to achieve the highest standard of nuclear safety, corroborated with the performance in environment protection, technological and economic development.

European Nuclear Installations Standards (ENISS): brings together policy makers and specialists in the nuclear industry, along with representatives from nuclear regulatory bodies to establish together security targets, regulations and security measures that will ultimately become a common set of European safety standards for the nuclear installations.

The European Atomic Forum (affiliation to the Romanian Atomic Forum): represents a non-profit European organization with the following purposes: supporting the role of the nuclear energy at an European level by active involvement in the energetic policy of the European Union, adopting support positions for member states operating Nuclear Plants and involving specialists in the work groups at European level in order to centralize different points of view and measures. The results of active attendance within different international organisms is directly reflected in the performance indicators associated to the fields: operation, radioprotection and radioactive waste management.

The nuclear industry, both at European and international level, is dedicated to contribute to overcoming the difficulties that Europe is experiencing. That is: To provide the required volume of nuclear capacity on time and at a competitive cost, in compliance with the latest estimates related to the share of nuclear energy in the energy combination with low carbon emissions. To perform research, development and innovation activities in Europe, in order to identify areas where the nuclear industry may contribute to the decarbonization of other areas, such as industry, heating and transports. To contribute to ensuring energy security: by implementing appropriate nuclear fuel policies in line with Euratom requirements, joining its forces (where relevant) to develop new leadership and partnership agreements in the EU and global distribution networks and also encouraging cooperation with energy regulators in order to further optimize the contribution of nuclear power plants to the stability of the EU's electricity grid.

To continue to set the standard for safety in the energy field, to continue to manage used nuclear fuel and radioactive waste in a responsible manner and invest in research in order to identify additional solutions for such waste. These include technologies to reduce the volume and toxicity of such residues, to reuse spent fuel or generated residues, to reduce radioactive life and ultimately to eliminate any residual waste. To invest in and maintain human capital. SNN is actively involved, by means of its specialists, at international level in everything that means information exchange, technological innovation, good practices, research and development. Hence the non-binding MOU with Nuscale for the exchange of information in the development of small modular reactors, the involvement of personnel in global organizations dedicated to nuclear energy in different working groups.

This context has also opened the way for Romania's accession to the CEM and implicitly our support for NICE Future, a global initiative to position nuclear energy as an important solution in decarbonization. We also have the same involvement within the European Atomic Forum. Recently, within the European nuclear industry, a Manifesto was signed on the role, the actual, concrete potential of nuclear energy at EU level in the medium and long term.

Another recent international cooperation from July is the conclusion of a MoU with Nordion Canada, the largest global supplier of Cobalt 60. This MoU is non-binding and intends to assess the potential of producing Cobalt 60 in the reactors from Cernavoda NPP. This isotope is produced in nuclear reactors from Cobalt 59. Currently, there are 22 reactors producing Cobalt 60 worldwide, of which 10 CANDU, in Canada, Argentina and China. The production technology of Co 60 was developed by Nordion and AECL Canada.

Exploring the possibility of producing this isotope at Cernavoda is a great step forward for the Romanian nuclear industry, in order to leverage yet another of the beneficial effects of the operation of nuclear plants, in this case for the medical system. We would like to become part of the international Co 60 community because we understand the importance for health that this isotope has. Furthermore, it represents a diversification for SNN and implicitly yet another source of income.

The decision, made following the technical studies and analyses, for the production of Cobalt 60 will in no way affect nuclear safety and production. Its collection will be done during the planned outages.

Any international cooperation comes with clear advantages for the company, different environments, energy system, employees. Islandisation and self-sufficiency are completely counterproductive.

XIII. ROLE OF NUCLEAR ENERGY IN THE DECARBONIZATION PARADIGM

2019 was characterized by increasing concerns regarding climate change and focusing on decarbonization targets and long-term energy policies that configure the role of nuclear energy, globally, regionally and nationally. At global level, interest in nuclear power remained mostly stable, especially in developing countries. Approximately 10% of the world's electricity is generated by the 440 nuclear reactors, with nuclear power being the second source of low-carbon electricity. In addition, more than 50 countries use nuclear energy in approximately 225 research reactors, which are also used for the production of medical and industrial isotopes as well as for training. There is a clear need for new nuclear capacities all over the world, in order to replace old power stations that use fossil fuels, especially coal, and which produce significant emissions of carbon dioxide, and in order to satisfy the high demand of electricity, especially in emerging states. Currently, approximately two thirds of the electricity of the world comes from burning fossil fuels. Until 2050, if the climate change objectives are achieved, 80% or more of electricity will have to be produced with low-carbon emissions. Nuclear energy is already reducing carbon dioxide emissions by approximately two gigatons a year, the equivalent of removing the emissions of over 400 million cars. A decrease in the production of energy from nuclear sources would seriously threaten the energy security and the achievement of environment targets and would inevitably lead to the release of billion of tons of carbon dioxide into the atmosphere, resulted from the replacement of nuclear energy with other generation sources, according to the International Energy Agency.

28 countries are considering introducing nuclear energy. Two of them - Belarus and the United Arab Emirates - are close to operating their first nuclear power stations, while Bangladesh and Turkey have started building their first nuclear power plants. These states need electricity for their economic growth, and this energy must be clean, in order to achieve the climate objectives. One of the best options at their disposal is nuclear energy, thus contributing to the global objective of decarbonizing the energy sector.

Extending access to energy and, at the same time, drastically reducing greenhouse gas emissions that cause global warming and climate change are among the central challenges of mankind in the 21st century. Nuclear power is a major part of the solution to produce carbon-free energy in many parts of the world, such as the United States, the European Union, South Korea, making an important contribution to reducing greenhouse gas emissions, while providing increasing quantities of electricity necessary to develop the global economy. Increased demand for electricity is particularly rapid in emerging countries, especially in Africa, where demand will increase by 100%- 450% until 2050. While today most people without access to electricity live in rural areas, most of the population growth by 2030 will take place in cities. Achieving the goal of securing access to electricity for an additional 1.3 billion people globally by 2030 will require a combination of less polluting power generation solutions. In this scenario, nuclear power will be part of the solution, due to the advantages it holds, such as stability in national systems, clean energy, baseload production. The contribution of nuclear energy to avoiding short-term CO₂ emissions will be achieved by nuclear power plants in operation, under construction and in preparation.

At European Union level, in order to achieve the goal of decarbonising the economy by 2050, a quarter of the electricity produced in the European Union needs to be from nuclear sources. In the European Union, nuclear energy ensures 26% of the primary energy sources and represents more than half of the energy with low carbon dioxide emissions that is produced. Currently, half of the nuclear electricity of the European union is produced in a single country - France, while 53 nuclear units that operate in three countries outside the European Union (Russia, Ukraine and Switzerland) represent approximately 17% of the electricity from the rest of Europe. The nuclear industry in the member states ensures 1.1 million jobs and generates a turnover of 102 billion euros a year. The most recent manifesto adopted by the European Group of Leaders from the Nuclear Industry, which S.N. Nuclearelectrica S.A. is a part of, signed in Bucharest on June 26, 2019, provides the longterm support of nuclear projects that directly involve initiatives of cooperation and alignment of interests between the industry and authorities. Regarding the prospects of nuclear energy in Central and Eastern Europe with the target of 2050, Romania supports the idea of a balanced and efficient energy mix in which nuclear power has a significant share and an important contribution to achieving the decarbonisation targets and the strategic objectives assumed by Romania. SNN, through the strategies and measures it has adopted, will continue to play an essential role in ensuring the stability and security of the energy system, both through its current capabilities and in the long run, through its major investment projects.

If we look at the forecasts of growth for the contribution of nuclear energy in the member states of the European Union, corroborated with the achievement of the decarbonization objectives for 2050, we notice a clear trend of invigorating the nuclear industry or of launching it in states that have primarily focused on fossil fuels: Bulgaria 36%, Poland 28%, the Czech Republic 54%, Hungary 58%, Slovakia 59%, Lithuania 53%, Slovenia 43%, Romania 27% (with the reactors of Units 3 and 4 operational).

In other regions in the world, especially those with an oil tradition, such as the MENA states, there are massive investments in the development of nuclear industry in order to meet demand and diversify medium- and long-term sources. The numbers are: 15.5 GW nuclear plants under construction, 37 GW planned, 67 billion dollars in contracts already concluded in the region.



Romania acknowledges the contribution of nuclear energy, the base production source, to the decarbonization of the energy system and promotes nuclear energy as a clean primary source of energy production. An important step in this direction is promoting innovation and new nuclear technologies, including the partnership with renewable energy, in order to facilitate the transition to an economy with low carbon emissions, nuclear energy being acknowledged as a “green”, nonpolluting, stable and safe source. On national level, by the energy strategy for 2050, the development of new nuclear capabilities is provided as an essential component of maintaining medium- and longterm energy independence and ensuring the achievement of the decarbonization targets.

Nuclear energy on global and European level is shaping up as a firm and reliable option for ensuring the current and future energy necessities, and is supported both by governments and by the people (in Romania, for example, the acceptance degree for new nuclear projects is over 65%), a continuously evolving industry, with innovative projects and proven performance. Romania is within this European development, by the firm commitment of the nuclear program and the role of regional hub of research and innovation.

