

2.1. General activity report of the INC DIE ICPE-CA

The National Institute for Research and Development in Electrical Engineering, ICPE-CA, functions, as a national institute of public law by Government Decision 1282, published in Official Gazette no. 775/24.08.2004, being coordinated by the Ministry of Education, Research, Youth and Sports - National Authority for Scientific Research.

For the period 2007-2011, the structure of the research unit was established according to the order NASR no 2504/29.10.2007 and 3676 / 22.04.2010.

In accordance with the last order, institute management is provided by:

- Administrative Council Board consists of seven members, appointed for a term of four years, which can be renewed: a President, a Vice President, five members;
- Board of Directors consists of 4 members (General Director, Technical Director, Economic Director, Scientific Secretary) that establishes the concrete actions necessary to deliver the results of strategy development programs of the institute, the annual research and development, the income and expenditure investment program, quality assurance system and other obligations;
- Scientific Council consists of 21 members, who include the General Manager, Technical Director and Scientific Secretary, and is composed of scientists with outstanding achievements in the field, but also of experienced professors;
- Ethics Commission consists of five members with professional prestige and moral authority.

The duties, responsibilities and skills of participatory management bodies are shown in "Status institution" and "Rules of Organization and Functioning".

What characterizes today INC DIE ICPE-CA is attention to basic research, applied and development, with particular emphasis on research, development and innovation in the fields of energy, materials, micro-and nanotechnologies, the engines of sustainable development of the society. The main activities include:

- basic and applied research in electrical engineering field;
- technical assistance and consultancy in electrical engineering field;
- information, documentation and staff training in electrical engineering field.

Thus, on the base of institute analysis done by a team of expert evaluators in 2009 in the project FP7-2007-REGPOT 206 119 "Promotion of Competence to the modernization of RTD Potential in Science and Technology" - PROCUST, the institute was reorganized in the 3 main departments:

- Department for Advanced Materials: functional / multifunctional and composites materials nanostructured and crystalline;
- Department for efficiency in conversion and consumption of energy (wind, solar, fuel cells, hydrogen storage): conversion, saving and recovery;
- Department for Micro-Nano-Electrotechnologies.

The Institute has also four testing laboratories:

- Laboratory for Testing and Characterization of Electrical Materials and Products (RENAR accreditation certificate LI 845 / 26.01.2010);
- Laboratory for Electromagnetic Compatibility (RENAR accreditation certificate 881 / 14.06.2010);
- Laboratory for Evaluation of thermal behaviour of products and materials (RENAR accreditation certificate LI 685 / 21.07.2008);
- Laboratory for Micro and Nanoelectromechanical Testing (accreditation in progress).

To achieve the strategic objectives required by the **mission**, namely, **research and development in electrical engineering field**, the institute deals multidisciplinary research activities and partnerships in numerous national and international projects. Thus, its activities in the period 2007-2011 was conducted mainly through the National Programme of Excellence Research, IInd National Programmes for Research, Development and Innovation, „Nucleus” Programme, as well as research grants and projects financed from EU programmes, as follows:

- 3 research grant;
- 97 projects in the National Research of Excellence Programme: 23 projects in coordination and 74 projects as partner;
- 23 projects in coordination, 44 projects as partners in the National RDI Plan II and 31 projects in the 2 Nucleus Programme (MATER and INGENIOS);
- 8 projects as partner in INNOVATION program
- 9 projects of bilateral cooperation with the JINR (Joint Institute for Nuclear Research) - Dubna, Russian Federation;
- 1 co-operation project with CERN – Geneva, Switzerland, “*Study on the radioinduced effects of aging on insulating materials of cables*”;

- 1 co-operation project with Università degli Studi di Trento in the European *PolyCerNet* project contract MRTN-CT-2005 01601;
- as partner in international project - FAIR (*Facility for Antiproton and Ion Research*) - Germany;
- UE/COST Action D43 (2006-2011): Colloid and Interface Science for Nanotechnology;
- UE/COST Action CM1101 (2011-2016): Colloidal Aspects of Nanoscience for Innovative Processes and Materials;
- 1 project in FP6-2004-ACC-SSA-2 "*Strengthening of the RDI potential for advanced materials and composites to enhance the performance of the electrical industry*" - INDUMAT;
- 1 project in FP7-2007-REGPOT 206 119 "*Promotion of Competence to Up-Grade the RTD Potential in Science and Technology*" - PROCUST;
- 1 project in FP7 REGPOT-2008-1 "*Developing RTD Potential of INCDIE ICPE-CA in the Field of Hydrogen and Fuel Cell Technologies (ICPE-HyFC)*", grant agreement no. 229 906;
- 1 project with the North-West Regional Development Agency within Competitiveness & Innovation Framework Programme, ENT/CIP/07/0001a "*Business Innovation Support Network Transylvania* " EEN 225 559 BISNet Transylvania-1;
- 1 project FP7-ERA NET 7-041/2011 "*Research and development of new functionalities for sports and health garments*";
- 1 projects within Sectoral Operational Programme "Increasing of Economic Competitiveness" (SOP IEC programme), Priority Axis II - Research, Technological Development and Innovation for competitiveness, the area of intervention 2.2, Operation 2.2.1, "*Modernization of the infrastructure for promotion of research potential in electrical engineering for applications in priority economic thematic areas of Romania as EU member state – PROMIT*";
- 1 projects within SOP IEC programme (Sectoral Operational Programme "Increasing of Economic Competitiveness"), Priority Axis II - Research, Technological Development and Innovation for competitiveness, the area of intervention 2.2, Operation 2.2.1, "*Advanced research for achieving carbon materials with thermal resistance subjected to irradiation, with high life time, for sealing rings*";
- 1 project on Cross Border Cooperation Programme Romania-Bulgaria 2007-2013, REACT - "*Integrated system for dynamic monitoring and warning for Technological Risks in Romania-Bulgaria Cross-border area*";
- 1 project on Cross Border Cooperation Programme Romania-Bulgaria 2007-2013, RES-OP-DEV "*Romanian - Bulgarian Joint Cooperation for the long-term and Sustainable Development of the young human resources in the field of the Renewable Energy Technologies in order to overcome the socio-cultural barrier to open common and Opportunities for getting a job and Their Employment Along the cross - border area*";
- project on Cross Border Cooperation Programme Romania-Bulgaria 2007-2013, "*Joint study regarding the promotion of renewable energy for the environmental protection, within the natural protected areas from the Lower Danube, the Danube Delta and the Black Sea Region*";
- 13 projects of bilateral cooperation with China, Bulgaria, Russia, Spain, Austria.

From the beginning until now, the institute has enjoyed a continuous scientific and technological progress, which facilitated the development of a large number of papers published in prestigious international scientific journals in the ISI database, Web of Science, (220 scientific papers published in journals with non-zero relative Article Influence Score and 83 scientific papers published in journals with zero relative Article Influence Score), scientific communications presented at national and international conferences (818), submitted patents (69), awarded patents (30), of many studies, norms, procedures and approvals (553), new products and technologies, functional models offered to customers.

Undoubtedly, national and international visibility is provided by the above-mentioned publication also recorded above, but also through participation in national and international scientific meetings (over 51 scientific events, 61 trade fairs and exhibition abroad (Hannover – Germany, Iran, Brazil, China) or national, , 114 national and international awards (Geneva, Brussels, Zagreb, Budapest, Bucharest).

Scientific events organized by INCDIE ICPE-CA under the auspices of Ministry of Education, Research, Youth and Sports - National Authority for Scientific Research had a wide range of areas and have developed into an interdisciplinary dialogue of researchers. Many of them took place at the institute, in our conference room of 100 seats, equipped with audio and video (10).

Also, various scientific meetings were organized in other research institutions of the country where ICPE-CA was collaborative (41).

Of great importance was the events media which was done by displaying on the ICPE-CA website and by using of existing channels of information.

Since 2008, the institute has hired a public relations counsellor, and since 2010 has been created *Office for Knowledge and Information Management*, where our activities have been covered more extensively in the media (TV stations, radio, and journals) through articles and interviews (408).

The presented papers at national and international conferences (818) have promoted the results of research and development, so that were established cooperation agreements with various national (10) and international entities (16 – Germany, Ukraine, Iran, U.K., France, Spain, Italy, China and Bulgaria).

With a flexible structure of the of research and design directions, the institute was involved in 68 other extra applied research contracts in areas such as new energy sources, specific materials, electrical engineering, environmental protection, electromagnetic compatibility, micro and nano electrotechnologies. In the same period the institute has hired about 44 contracts with various customers both in the economic environment and that the administration to request various services performed.

Approach to research results and economic environment in order to highlight the importance of the institute, the Centre for Technology Transfer CTT ICPE-CA, founded on 01.04.2004 operating under the authorization certificate no. 3/2004 of Ministry of Education, Research, Youth and Sports – Department for Technology Transfer and Infrastructure, reaccredited by decision no. 48/1.03.2011, has facilitated a number of technology transfers (12).

Thus, in the field of new energy sources, the institute has transferred the technology of: 5 kW fuel cell with electric co-heat to SC Roseal Odorheiul Secuiesc; generators for wind turbines of 1.5 and 3 kW to Electroprecizia - Sacele and 1.5 kW wind turbines to ROFEP Urziceni.

In the field of advanced materials, the institute has transferred to SC Roseal Odorheiul Secuiesc carbon-ceramic composite material and magnetic circuit design methodology for magnetic coupling that equip green pumps (loss zero) and to the SC ROFEP SA Urziceni the manufacturing of carbon materials (EGR, BGR, CDR, MGR) technologies to replace lead in MGR recipes.

We should not omit other ICPE-CA products transferred to industry. We mention in the following only a few: equipment for measuring and controlling the dynamic balance of MRC shaft, the computerized system for control, diagnosis and final testing of brake pneumatic equipment of railway vehicles, automatic non-destructive testing equipment of rail safety components, stand for computerized testing and diagnosis of dampers for railway vehicles, stand for computerized checking of generators or electric motors, all transferred to SC Grivita SA – Bucharest.

For customers of technological transfers that we mention above, we believe that the economic effects were and still are important.

Under the national programme "Development of innovation infrastructure and technology transfer INFRATECH", initiative of the National Authority for Scientific Research - Ministry of Education, Research, Youth and Sports, our institute developed in 2007 a business incubator in the ICPE-CA Branch from Sf. Gheorghe, accredited by decision no. 9604/2008 of NASR, ITA ECOMAT ICPE-CA, which is part of the National Network for Innovation and Technology Transfer ReNITT. *Technology and Business Incubator ITA ECOMAT ICPE-CA* provides support (assistance and expert advice, space for activities, secretariat services, communication, and access to the utilities) for the establishment and development of 10 SMEs in the productive sector, including electrical engineering services.

In the same direction of turning the research results of the institute was created in 2007 the spin-off SC ROMNEOMAG SRL with certificate of registration B 1102187 (J40/14816/03.08.2007, CUI 222 133 743) which had the object of magnetic materials producing (AlNiCo and NdFeB permanent magnets). In 2011, following the decision of Unique Associate, ICPE-CA was included as the main shareholder, owning 95% of the share capital of the company, as it was increased. Contribution of ICPE-CA to increase the share capital consists in evaluating a patent, as provided by Ordinance no. 57/2002, completed to date (article 23, paragraph 3). Certificate of registration B 2456467/11.08.2011 was issued by ONRC (National Trade Register Office) following the revision of NACE code that replaces the old.

In 2011 was initiated development of a second spin-off that has been approved for funding through the structural Programme POS 2.3.1, the project having the title "Electrical boat supplied from renewable energy sources".

Human resources

Regarding the quality of human resources, INC DIE ICPE-CA has a total of 184 employees with non-determined-time labour contract from which 6 employees with determined-time labour contract. The average age of staff is around 43 years. Between 2007-2011 can be notice a decrease in the number of employees, thanks to retired of staff more than 65 years. As can be seen in Fig. 1 and 2, in 2007-2011 the institute staff consists of scientists which have a high-class assimilation potential of latest technology and constantly adapting to market requirements. So far, about 70% of the 184 employees are highly educated, 54 are PhD with different specializations (physics, chemistry, electrical engineering, metallurgy, mechanics, biology).

R&D staff structure, TT staff and non-R&D staff related to the total employees of INC DIE ICPE-CA in present

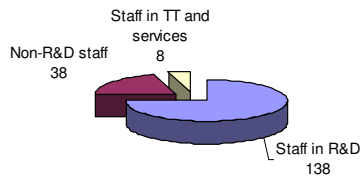


Fig. 1

R&D certified higher educational staff of INC DIE ICPE-CA in present

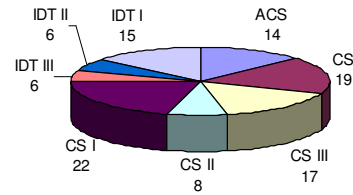


Fig. 2

Always the institute concerned for improvement knowledge, so employees are involved both in masters and doctoral courses (2 masters and 34 PhD students), as well as in specialized courses (this year was organized a training course for LabView program, involving a total of 50 employees).

Also ICPE-CA technical library offers Romanian and foreign books and journals: 22,080 books and 25,000 journals, which help the researchers in their research projects.

Library has digital documents: on-line access to 30 electronic IEEE-journals, 7 online databases that contain full text articles, abstracts and bibliographies (immediate access to journals: EBSCO, SPRINGERLINK, Elsevier, IEEE, Science Direct, Taylor and Francis, Thomson Reuters).

INC DIE ICPE-CA operates through its representatives as a member of the European platform and professional associations, thus contributing to the harmonization of Romanian research policies with European ones.

Also, a total of 6 researchers (Lingvay I., Ignat M., Budrugaec P., Kappel W., Samoilescu Ghe, Setnescu R.) are recognized reviewers specialized in ISI journals such as *IEEE Transactions on Nanotechnology*, *International Journal of Chemical Kinetics*, *Journal of Marine Technology and Environment*, *Journal of Applied Polymer Science*; Dr. Eng. Budrugaec is a member of the editorial staff of the *Chemical papers* - ISI quoted journal, a number of 5 researchers (Lingvay I., Ignat M., Budrugaec P., Kappel W., Samoilescu Ghe, Setnescu R.) are members of the editorial staff of national journals such as: *International Journal of Conservation Science*, *EEA - Electrical, Electronic, Automation*, *Journal of Sciences and Arts*, *JOAM – Rapid Communication*.

From another point of view, since 2001, there is staff health policy, so there is a health office which provides medical services including complete compulsory year medical tests.

For motivation, reward and loyalty of its employees, the institute provides meal tickets, extra salary benefit governed by law 142/1998.

Infrastructure quality and its utilization

Evolution of turnover for the last four years (Fig. 3) highlights the dynamic development of the institute between 2007 and 2010. The drastic reduction of research funds in 2009 and 2010 respectively, the turnover decreased to 21.936 thousands lei in 2009. However, investing in future, ICPE-CA continued equipment investment policy with the best equipment, so that, even in crisis conditions, facilities have reached the highest level (15,375,024.87 lei) in 2010 due to project “*Modernization of the infrastructure for promotion of research potential in electrical engineering for applications in priority economic thematic areas of Romania as EU member state – PROMIT*” financed under SOP IEC, Priority Axis II, the area of intervention 2.2, Operation 2.2.1.

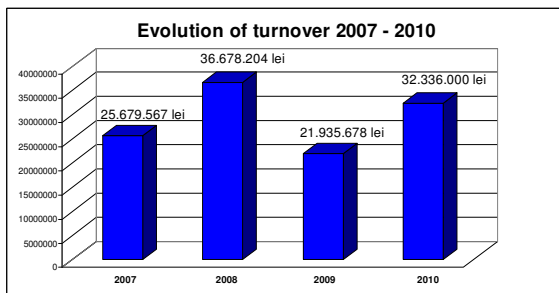


Fig. 3

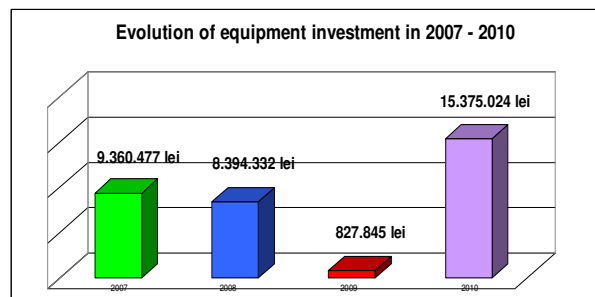


Fig. 4

The increase of investment, both from its own and attracted funds, as well as budgetary sources, presented in Fig. 4, allowed the institute and its research staff, on the one hand, the approach of new research directions, and on the other hand, increase the quality of research.

Regarding the acquisition of equipment and materials, they are made in accordance with Government Emergency Ordinance no. 34/2006 and procedures set out at the institute. From 2007 to the present we have been purchased over 80 equipment with a value more than 15.000 Euro, which means the request for offers, open auction, and posting them on the SEAP (Electronic System for Open Auction).

Management of our institute is based on employee contributions. In fact, an important role in decision-making and institutional scientific development has, in addition to the Administrative Council Board, Scientific Council and the Steering Committee which includes heads of laboratories and the Committee for Labour Security and Health (CSSM).

Nucleu programme is the national programme that all researchers are invited to participate in the development of research topics so that lead to new directions for research.

The objectives of topics for Nucleu Programme projects of 2007 - 2011 were the subject of many debates and selection of topics was based on objectives and results that they propose.

The reputation of the institute integrity is a vital asset to our institute, it is built on commitment to employees of ICPE-CA to respect the Code of ethical and professional conduct for society and laws, Code of conduct guided us through a number of principles that reflects the ICPE-CA values and established standards that govern our ethical behavior.

Both in the collective labor contract, and in the job description for each employee, there is a methodology for evaluating the activity of RDI and researchers' own results - DEP (procedure for development and evaluation of performance) - introduced experimentally in 2011 - which sets their evolution in time and their performance in relation to the assigned tasks.

Also, in 2011, in the institute were developed procedures to serve like documents handling (e.g. decisions of the Directory Board, procurement of materials / products / services / works, open auction, archiving of documents, financial documents), so to allow a fluidity and a reduction in working time and solving of documents.

Taking into account that in the Institute is developing FP7 and Nucleu national programme projects, projects from structural and cross-border funds, it was necessary that the personnel from Accounting and Planning Office to be more actively and involved in preparing financial documents for these projects. Thus, each project was assigned a person to operate the financial area. Our own enterprise resources planning system allows this.

Environment-Quality Management Office has developed, implemented and certified Integrated Quality-Environment Management System, in conformity with ISO 9001 and ISO 14001 standards. The system is promoting parts of the general policy of the institute, quality and environmental policies, documented in general procedures of the system, as well as specific procedures of work and environment, instructions, decisions. Quality and environmental protection policy is consistent with the vision and strategy of the highest level management, adequate for the organization, communicated and understood within the Institute. This provides a framework for establishing and analysis of quality objectives and environmental protection respecting the Integrated Quality-Environment Management Program. ICPE-CA INCDIE has Environmental Authorization no. 34/24.01.2008.

Monthly salary coefficient is discussed, in conformity to our Collective Labour Contract (CCM), for all employees from ICPE-CA. There are not delays in paying the salaries, except the first month of the year 2009, 2010 and 2011, for which the salaries were paid with an subunitary coefficient, but which was compensated in the same year.

The administrative work of researchers was reduced every year through precisely introduced procedures, also through our enterprise resources planning system, which allows following and indentifying quickly and easy every paper.

Through our last investments in infrastructure, we argued the working conditions in every laboratory; even the protective atmospheres for different equipments (9 in number) can be centralized delivered to the right place. For the execution of many contracts, we use time limited hiring of scientists, which were paid quickly from the different contracts.

The participation of the employees in decision-making is assured by our Collective Labour Contract, negotiated with our Trade Union through the presence of representative of our Trade Union in the meetings of our Administration Board (observer), Directory Council (member), Scientific Council (secretary of the Council), Committee for Ethics (member), Committee for Labour Security and Health (member), also through our yearly organized competition for scientific degrees, through our DEP-procedure. Finally, it must be noticed, that our Collective Labour Contract includes the main "stipulations" of the European Charter for Researchers and Code of Conduct Recruitment of Researchers.

Team 1

SELF-ASSESSMENT REPORT Office for Management of Quality-Environment

1.2. Staff list by research team

Dr. Eng. Alecu Georgeta – senior researcher 1st degree, head of office
PhDs. Eng. Voina Andreea - Technological development engineer 3rd degree
Eng. Tanase Stefania – main engineer

1.3. List of publications and patents

Publications:

1. **Georgeta Alecu, N.Stancu, S.Zamfir, A.Cosac**, Superconducting properties of MgB₂ materials, Journal of Optoelectronics and Advanced Materials, Vol.9, No.4, p.1187-1189, ISSN 1454-4164, ISSN 1841-7132, 2007
2. **Georgeta Alecu, Andreea Voina, Wilhelm Kappel, Carmen Mateescu**, Safety and health legislative requirements regarding workers exposure to risks generated by electromagnetic fields, Revue Romaine des Sciences Techniques, Série Électrotechnique et Énergétique, Tome 53, no. 2bis, pp.7-12, ISSN 0035-4066, 2008
3. **Georgeta Alecu, V. Aldica, Andreea Voina, Silvia Hodorocea**, Pit method for obtaining of MgB₂ wires with SiC powder added, Journal of Optoelectronics and Advanced Materials, Vol.10, No.11, pp. 2981- 2984, ISSN 1454-4164, 2008
4. Cristian Ravariu, **Georgeta Alecu, Ala Bondarciuc**, Florin Babarada, Advanced SOI semiconductor structures for micro-dose biological samples handling, Journal Optoelectronics and Advanced Materials-Rapid Communications, vol. 4, no. 9, pp. 1375-1378, ISSN 1842-6573, ISSN 2065-3824, 2010
5. M.Vasilescu, **Georgeta Alecu** - Progress in manufacturing and characterization MgB₂ superconducting wires, Metalurgia International, vol.XV, no.3, p. 9-12, ISSN 1582-2214, 2010

Patents:

1. Marius Enache, Victor Suciuc, **Georgeta Alecu**, Violeta Poenaru, Ion Nedelcu, Octavian Fratu, Ana-Maria Dragomir, Lucian Mateescu, Patent application no. A/01127 of 17.11.2010 "System for carbon monoxide monitoring"

1.4. List of ongoing projects

Project of the Romania-Bulgaria cross-border cooperation Programme 2007-2013, REACT - "Integrated system for dynamic monitoring and warning for technological risks in Romania-Bulgaria cross-border area". In this project, in solving the tasks of this project, besides the team of the Office for Management of Quality-Environment, are involved another 10 researchers from the institute.

2.3. Activity report by team

Office for Management of Quality-Environment operates under various titles, since 2001. Two years later, in 2003, after winning a CALIST project, we developed, implemented and certified Integrated Quality-Environment Management System, in conformity with ISO 9001 and ISO 14001 standards. The system is promoting parts of the general policy of the institute, quality and environmental policies, documented in general procedures of the system, as well as specific procedures of work and environment, instructions, decisions. Quality and environmental protection policy is consistent with the vision and strategy of the highest level management, adequate for the organization, communicated and understood within the Institute. This provides a framework for establishing and analysis of quality objectives and environmental protection respecting the Integrated Quality-Environment Management Program. We try to meet the requirements of law by maintaining and continuous improvement of this system.

During the four years of reporting, office staff had the following changes:

- In 2007, the number of employees was 7 (1 Dr. Eng., 2 PhDs engineer, 3 engineers, 1 technician);
- In 2008 and 2009, the number of employees was 6 (1 Dr. Eng., 2 PhDs Eng., 2 engineers, 1 technician);
- In 2010 and currently, the number of employees is 3 (1 Dr. Eng., 1 PhDs engineer, 1 engineer).

The components of the team is:

Dr. Eng. Alecu Georgeta – senior researcher 1st degree
PhDs. Eng. Voina Andreea - Technological development engineer 3rd degree
Eng. Tanase Stefania – main engineer

Although small in numbers, staff training is appropriate for specific activities office. Thus, team members have completed training and specialized courses: Internal Environment Auditor, 2005, Bucharest, organized by AFAQ, "External auditors for the environmental management system", Bucharest, 2005, organized by Quasaro, Quality Assurance Services, Bucharest, "Integral Environmental Studies" at the Flemish Institute for Technological Research, VITO, Mol, 2006 - Belgium, "Structural Funds Management" course organized by GTJM - Training and Development, Romania-Italy, 2006, program specialization "Manager in the Quality area", 2010.

By its activity profile, staff of the *Office for Management of Quality-Environment* can be involved in activity of protection and conservation of environment, judicious use of material resources, and pollution prevention and control. Specific research projects of environmental protection and research and development projects in the field of electrical engineering materials are approached.

INCDIE ICPE-CA has environmental authorization no. 34/24.01.2008.

By his team have been elaborated the Manual of Integrated Quality-Environment Management System and 41 general procedures (15 general procedures and 26 process system procedures - the last update was in March 2011). Also, in the office have developed methodologies/procedures for environmental factors: determining the level of noise in industrial environments, dissolved oxygen determination, determination of O₂, CO, CO₂, NO, NO₂ from the flue gas, the procedure of method validation for non-standardized test: determining the concentration of sulfates in the wastewater.

In the laboratories accredited by RENAR (Laboratory of Thermal Behavior Assessment of Materials and Products by Thermal Analysis, Laboratory for Characterization and Testing of Materials and Electrical Products, Laboratory of Electromagnetic Compatibility) 21 system procedures were developed specific to each laboratory.

In order to obtain accreditation for Testing Laboratory for Micro and Nano-electro-mechanics, it has developed 20 system procedures.

There is a database (on paper, and partially electronic) regarding legislation in environmental protection and quality management that is followed, constantly updated and notified to the departments.

Our work, systemized in the integrated system management program, has as main objective the protection of the environment, under the law.

Every year, are made measurements for monitoring and control of environmental factors (air, water). Were supported prevention measures for discharge of wastewater resulting from technological processes, tracking pollutant loading limits in conformity with MAPPM 645/30.10.97 and 730/10.11.97 Orders. We have contracts with specialized and accredited companies for determining air quality indicators (dust, CO, CO₂, HC, NO_x, SO₂, related to the stationary sources of emissions from operation of two FERROLI boilers from heating system, also dust, VOCs, TOC, related to processes developed in the institute). Also, are kept under control and waste water by physical-chemical analysis on samples of waste water (temperature, pH, suspended solids, BOD₅, COD-Cr, NH₄⁺, total phosphorus, sulfate, substances extractable with petroleum ether, biodegradable synthetic detergent active anion, chloride, polycyclic aromatic hydrocarbons, Cd, Cr, Pb, Cu, Ni, Zn, trichloromethane etc.). In parallel with tests made by accredited companies, our office is involved in carrying out physical-chemical analysis for assessing environmental quality (water and air), and noise measurement. After performing the measurements for monitoring environmental factors, it was found that maximum admissible limits are those appropriate to legal provisions.

Following the performance of national and international projects, we managed the endowment of workspaces with appropriate equipment to protect personnel, working environment and ambient environment: electro-filters for heat treatment furnace, electrostatic machines to capture dust from grinding and mechanical processing, absorbing hoods, chemical niches, defenders of grinding mill, the ventilation system to operations of cutting, mixing, baking, graphitization and to mills for the team of brushes etc.

Consumption of natural resources related to the activities in the institute was reduced by identifying and introducing in technology streams of waste generated from the activities.

According to existing records to Supply, it was found that, compared with previous years, energy and water consumption (due to function of water supply shaft, body J) was reduced.

We have taken measures to comply with Government Decision 856/2002 regarding the waste management records and for the approval of the waste list, including hazardous waste. In this respect, special places for disposal of technological and household waste are set and labeled. Container located in the wastes platform near the body J, serves at the institute needs (household waste) and is downloaded whenever necessary.

Under current legislation, management of toxic and hazardous substances is done centrally at the institute, by the designated responsible.

It monitors the selective waste collection and recovery through specialized companies: iron (REMAT West) and paper - REMAT West. Waste collected from both the research as well as the disposal of fixed assets and equipment as a result of refitting work spaces. Only during 2010, were recovered 5780 kg iron scrap and 1400

kg paper scrap, amount being 5578 lei, respectively 680 lei. Also, starting February 2010 was issued an internal decision that decided the collection of waste from electrical and electro-technical equipment, WEEE. In April 2011, 960 kg of WEEE was delivered to REMATHOLDING. Special attention is paid and monitoring of PET and used oil.

Identifying new opportunities to use raw materials and materials in the form of new products is an operation that takes place continuously.

In order to increase professional competence and results communication have been achieved internal training, external training and specialty according to the annual staff training. Every year, it performs at least four internal trainings for system enhancement and understanding of legislation necessary for carrying out in good conditions of the activities carried out in the institute.

The staff is retraining regarding compliance with environmental protection rules and aware of their activity and the risks of violating the rules and how to act in case of emergencies. Thus, annually, are "directed" and made at least one simulation in case of emergencies detected and found to exist in the institute.

The system also provides external or internal audits. External audits are led by two bodies recognized nationally and internationally: SRAC (QMS + EMS surveillance) and RENAR (supervisory of accredited laboratories from institute). Internal audits are led by members of the office. On average, according to the audit program, was carried out annually a total of about 75 internal audits (audit of QMS, EMS and product audits) in all departments. Following internal and external audits performed, it demonstrated that Integrated Quality-Environment Management System was maintained in the institute. Non-conformities and observations made by the audit team make that organization to propose a performance improvement efficiently and effectively to respond to changes. Assessment results of auditors are a continue analysis subject, resulting in maintaining and improving the system.

In the same integrated management system is made the control of the processes and conformity of manufactured products, non-conformities identified is contained in the non-conformities Synoptic.

In terms of measuring and monitoring devices has been prepared and respected annual calibration plan, and maintenance of devices and equipment was performed both in collaboration with specialized companies, and the effort of members of The Administrative Office, The Chief Mechanic.

The services offered by *Office for Management of Quality-Environment* consist of physical-chemical analysis of environmental factors by determining of O₂, CO, CO₂, NO, NO_x in the flue gases, carbon monoxide levels in ambient air, noise levels in industrial environments, measurements of water quality (drinking, waste, salt) and consultancy services on environmental issues.

The most important project during the reference period achieved by this staff is: Information system for real time analysis of risk factors for the environment and public health.

Research conducted in the project have resulted in an informatics and communication system and establishing of a method related to environmental monitoring of carbon monoxide, system which can extend also and can include monitoring of other air pollutants (e.g. NO_x, CO₂, CO, SO₂, O₃).

The system was designed in an open architecture (depending on the needs of increasing/decreasing the number of bridges, can be added or removed terminals to/from the system), integrating several types of technology in "on-line" applications (TCP/IP, GPRS, GPS, interactive portal for the exchange of information and multiple access) with the air quality analysis methodologies (in this case, CO). It contains an interactive portal for the exchange of data and information that allows building a virtual community of suppliers and users of environmental data.

The computer system being in conjunction with the strategies of action in case of alarm, leading to a greater reliability, achieving an integration of concepts of technological accidents, real time monitoring of pollutants and the processes, leads to prevention of accidents occurrence.

Beneficiaries of results:

- Application of "early warning": units with high-risk technological capability for environment and population (e.g. petrochemical industry, cement plants);
- Applications of air quality monitoring and analysis (on large areas or cities): environmental guard, environmental NGOs, environmental agencies);
- Applications for healthcare analysis and application of warning and prevention measures (in the traditional areas polluted by a certain factor): institutions responsible for public health, private medical institutions.

Written,
Dr. Eng. Georgeta Alecu

SELF-ASSESSMENT REPORT Advanced Metallic Materials

Part of the Department for Advanced Materials (MAv), the Advanced Metallic Materials Group (AMMG) has a personnel structure as in Table 1.

Table 1. Personnel structure of the Advanced Metallic Materials Group per years:

Number of people/ from which	2007	2008	2009	2010	2011
Certified personnel	13	14	14	13	13
CS I	2	2	2	2	2
CS II	1	1	2	2	3
CS III	2	3	1	1	
CS	2	5	5	3	3
IDT I	1	1	1	1	1
IDT II	0	0	1	1	
IDTIII	0	0		1	1
ACS	5	2	2	2	3
Secondary education	6	7	7	7	7
Technicians	6	7	7	7	7
Total	19	21	21	20	20
Males	8	8	8	8	10
Females	14	16	16	15	13
Young people (under 35 years old)	6	7	7	6	7
The average age	35.32	36.04	36.92	38.26	37.70

The evolution of the personnel structure presented in the Fig.1 shows that the number of the certified personnel/secondary education is more or less the same during the all time period. As seen in Fig. 2, the certified staff structure is changed every year according to the institute policy in the field of human resources development.

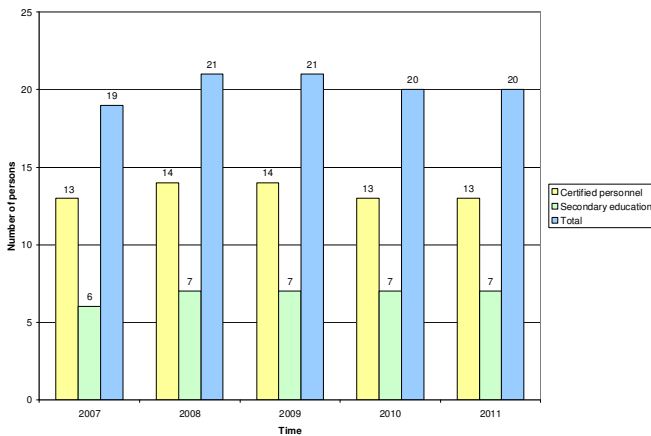


Fig. 1 Staff structure of the AMMG and its evolution in time

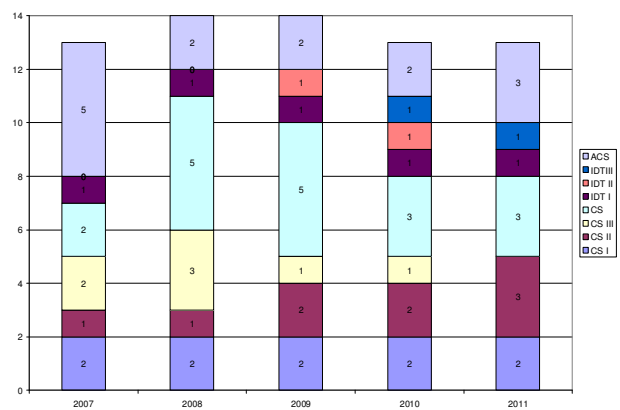


Fig. 2 Certified personnel structure of AMMG and its evolution in time

The share of young staff in the personnel structure group shows a variation between 46% and 53% of total certified personnel proving a continue concern for the formation of new generations of specialists (Table 1), which is evidenced also by the small average age of the personnel group.

In the frame of the AMM Group were won and on carry out a great number of research and development projects, including also, bilateral and European projects, mainly related to applied research (Fig. 3).

Also, the AMM Group is involved in direct contracts for economic customers to obtain metallic components especially for electrotechnical applications. In 2007, from the AMM Group split off a spin-off company, this is active in the field of magnetic materials and products (SC ROMNEOMAG

SRL). The main activities of the AMM Group are concretized in developing new research directions, needs and market oriented always having in mind national and European priorities.

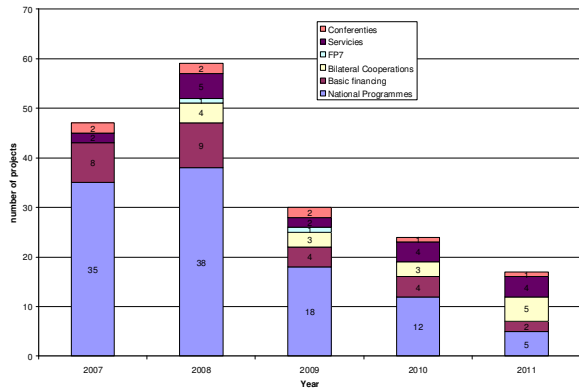


Fig. 3 Project distribution by type

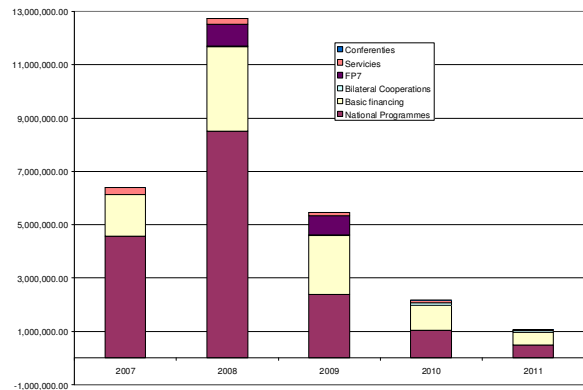


Fig. 4 Total incomes by 2007-2011 period

Total incomes per year and type of projects (Figure 4) shows a continuous decrease in values from 2008 (due to the reduced research funds) and a balanced funding between the research funding and basic financing in 2011.

Results obtained after completion of R&D contracts and from other types of contracts are summarized in Figure 5. Although, the incomes are decreasing in the last three years, it has to be noted that there are a rising trend of outcomes (scientific indicators).

Relevant results

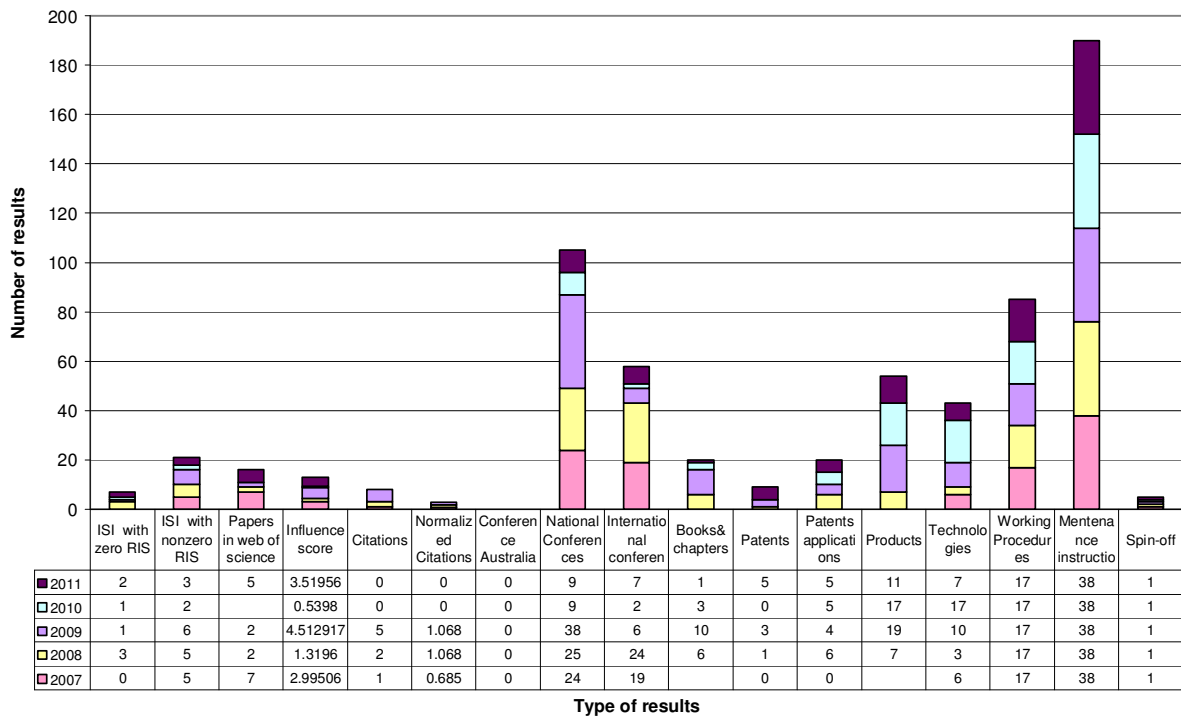
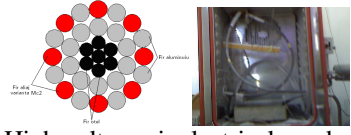
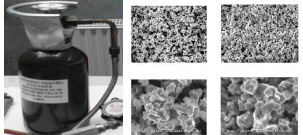
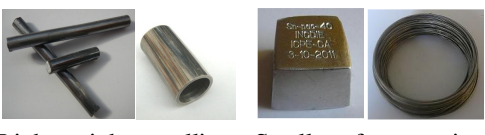

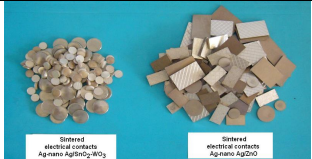
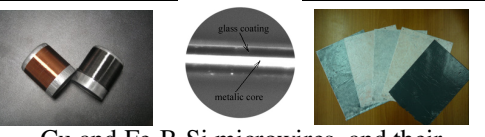
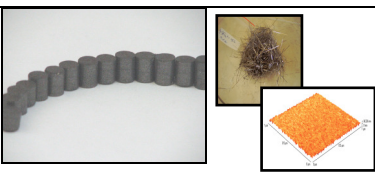
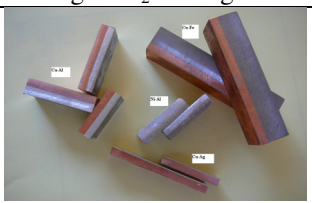
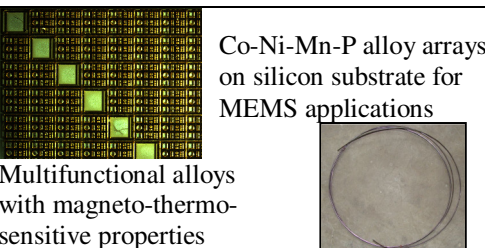
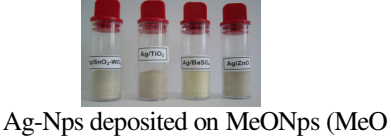
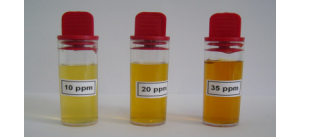



Fig.4. Scientific results during 2007 – 2011 period

It is important to mention that most of the research projects were finished with technological transfer documents and patent applications (Securized paper - SC Ceprohart SA, High voltage air electrical conductor self-protective at frost and ice – SC IPROEB SA Bistrita, Colloidal Ag solutions – SC Magnum SX SRL, Soft soldering Sn alloy and Corrosion resistant Sn alloy - SC Sudotim SRL; Ecological sintered electrical contacts – CASRAM LTD –Switzerland, Electroaparataj SA, Hydrogen storage materials used for developing with INCDTIM of some single and three stages thermal compressors).

Relevant research results obtained within the AMM Group are related to energy and electrical engineering applications, automotive, medicine, and special applications, few of them being presented further.

Energy, Automotive	 High voltage air electrical conductor self-protective at frost and ice	 Materials for hydrogen storage	 Light weight metallic composites Sn alloys for corrosive protection and soft soldering
Electrical engineering	 Rivets, electrical contacts Heavy alloys sintered products	 Sintered electrical contacts of Ag-SnO ₂ and Ag-ZnO	 Cu and Fe-B-Si microwires and their applications as fillers for flexible electromagnetic shields
Special Applicatins	 Nd ₂ Fe ₁₄ B/ α -Fe magnetic nanocomposites	 Diffusion bonding of dissimilar materials	 Co-Ni-Mn-P alloy arrays on silicon substrate for MEMS applications Multifunctional alloys with magneto-thermo- sensitive properties
Medicine	 Ag-Nps deposited on MeONps (MeO = ZnO, TiO ₂ , SnO ₂) and on BaSO ₄	 Colloidal Ag solutions	 Amovable systems for stomatology

Strategy of the AMM Group for the next 3 years is governed by 3 elements: efficiency, relevance and visibility increasing. For this reason, the main research directions are oriented to sustainable development of new products and applications in great interest fields: energy, electrical engineering, medicine, automotive, by developing high performance materials with low environmental impact.

AMM Group future development strategy

Research areas	Energy	Electrotehnique	Structurals	Medicine	Sustainable development	Special products
Thin films deposition	X	X			X	X
Lightweight composite materials and structures	X	X	X	X	X	X
Bonding of dissimilar materials	X	X	X	X	X	X
Coating technologies and surface engineering	X	X	X	X	X	X
Biocompatible, bioactive and bioresorbable materials			X	X	X	X
Materials for portable power sources (batteries, fuel cells)	X	X	X		X	X
Nanomaterials (metallic, intermetallic compounds, nanocomposites)	X	X	X	X	X	X
Magnetic materials and technologies for MEMS	X	X	X	X	X	X
Microwires for sensors applications	X	X	X	X	X	X
Composite materials for electromagnetic shielding	X	X			X	X

The AMM Group strategy will target to continue collaboration for development of FAIR and ELI infrastructures, especially for finding new solutions of materials and composites for electromagnetic shielding (expanded metals, composite materials with metal short wires, electromagnets, electromagnetic field simulation etc). The AMM Group will continue their policy to enhance the network with industrial partners in order to attract projects from Structural Funds and Voucher Funds with the aim of increasing their competitiveness by technical services offered to industrial companies. Development of new ways for researches inside the “Clusters” and “Competitiveness Poles” structures will be in account.

Increase efficiency and quality of research results may be reached also, by creating a group for modeling & simulation of materials and processes.

Team 3

SELF-ASSESSMENT REPORT Carbon –Ceramic Materials

Part of the *Advanced Materials Department (MAv)*, the *Carbon – Ceramic Group* includes carbon and ceramic materials laboratories. Personnel structure and its evolution in the last 5 years are presented in the diagram below.

Tab. 1 Personnel structure of the Carbon – Ceramic group per years

	2007	2008	2009	2010	2011
Number of people from which:	29	29	28	23	21
Specialists (CS, IDT)	17	19	18	12	12
Not certified	1	1	1	1	-
ACS	2	-	-	-	1
Young people (under 35 years old)	9	7	6	4	5
Technicians, workers	9	9	9	9	8
Males	17	17	16	15	14
Females	12	12	12	7	7

There is a decrease in the number of the staff of Carbon – Ceramic group (Fig. 1). The downward trend during the 2007 - 2011 in the number of certified staff (Fig. 2) occurs due to the retiring, end of a series of temporary individual work contract and, also, due to the recent reorganizing of the institute, in 2010, when, a part of the specialists were transferred to applicative departments, mainly ECCE.

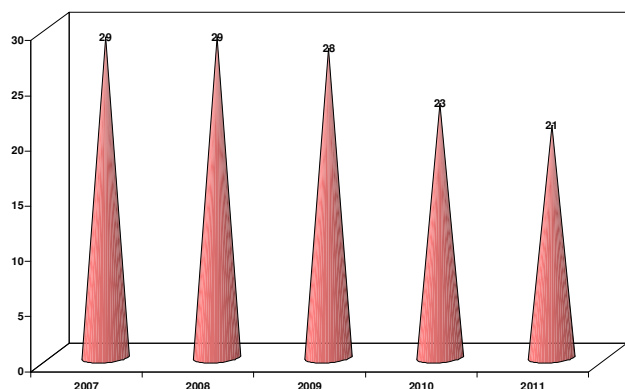


Fig. 1 Staff structure of the MAv department its evolution in time

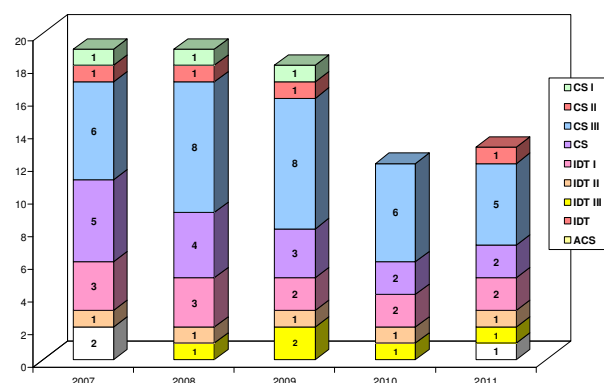


Fig. 2 Certified personnel structure

According to the institute policy for human resources development, the current personnel structure allows future developments for certified staff, taking into account the great number of young peoples being in the professional increase.

In the last 5 years, in the frame of the Carbon-Ceramic group were won and carry on a great number of research and development projects, mainly related to applied research (Fig. 3). The main activities of the Carbon – Ceramic Group are concretized in developing new research directions, need and market oriented always having in mind national and European priorities.

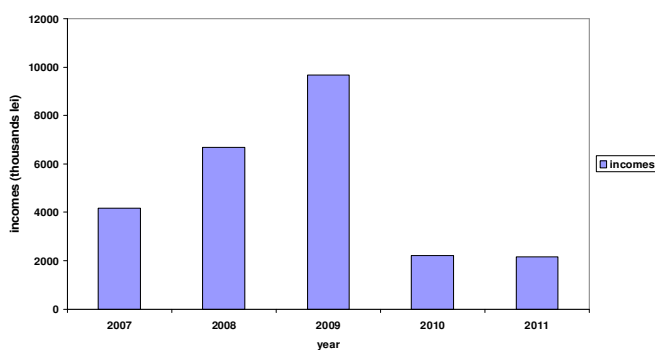


Fig. 3. Total incomes per 2007 - 2011 period

The total incomes from research projects and services contracts of the Carbon – Ceramic Group in the 2007-2011 time period, presented in Table 2 and Figure 5, shows a dramatically decrease after 2009.

Project distribution by type and year is presented in the diagrams below.

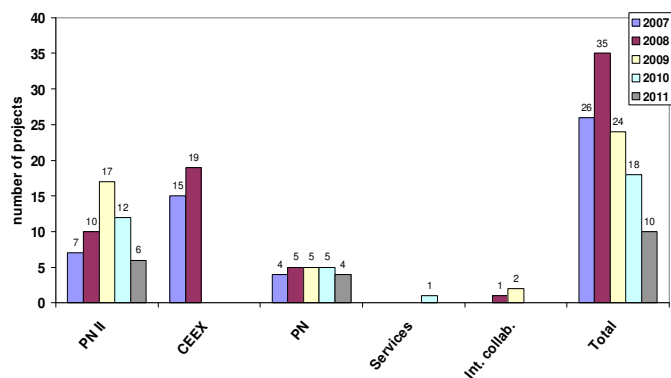


Fig. 4. Projects distribution by type

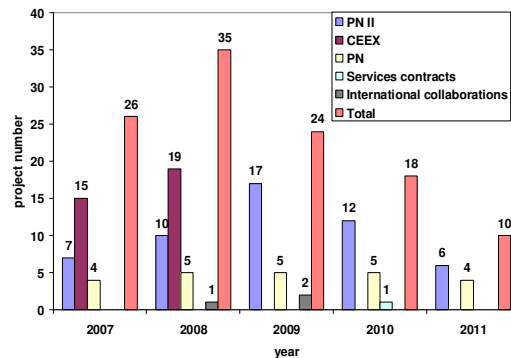


Fig. 5. Projects distribution per year

Results obtained after completion of research and development contracts and from other types of contracts are summarized in Table 2 and Figure 6. Although, the incomes are decreasing in the last two years, it has to be noted that there exists a rising trend of research results (scientific indicators).

Tab. 2. Scientific indicators during 2007-2011 period

	2007	2008	2009	2010	2011
ISI papers with nonzero influence score	3	14	8	7	5
RIS>0.3	1	4	0	0	2
0<RIS<0.3	0	3	5	3	1
RIS=0	2.0	7	3	4	2
Influence score	2.1250	0.8280	0.6804	0.6804	1.4210
Patent applications	0	3	0	2	4
Patents granted	0	0	1	1	2
Published books	0	0	0	1	0
PhD thesis	0	0	2	0	0

It is important to note that even there is not a great number of ISI papers, the research results in the

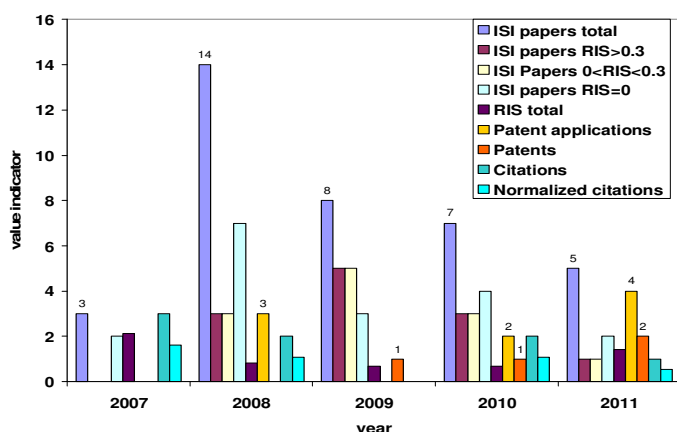
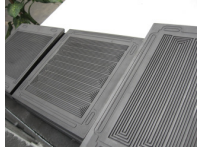
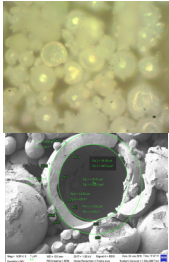

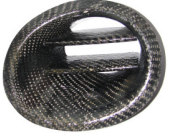





Fig. 6. Scientific indicators during 2007-2011 period

Carbon – Ceramic Group are quite notable such as shown by the number of patents and patent applications in the last years (mainly 2010 – 2011).

Beyond the presented indicator, the scientific results of the group can be expressed by a great number of products, technologies some of them being certified and transferred / to be transferred to industry as, for example: technologies for lead free graphitic materials (transferred to SC ROFEP SA Urziceni), technologies for carbon/ceramic volume resistors, graphite/polymer bipolar plates (transferred to SC ROSEAL SA).

Examples of relevant research results obtained in the frame of Carbon – Ceramic Group are related to energy applications, bio-medicine, automotive or electromagnetic wave protection. Few representative research results are presented below:

Energy	Bipolar plates (graphite/polymer composite)		EMI shielding	Ceramic microspheres (Insulating coating material)	
	Carbon fiber composites				Flexible electromagnetic shielding materials
Medicine	Porous ceramic scaffolds			Microporous calcium phosphate granules/beads	

Strategy of Carbon – Ceramic Group for the next 3 years is governed by efficiency, relevance and visibility increased. Part of the Advanced Materials Department (Mav), the Carbon-Ceramic Group follows its general strategy for development. Benefiting the advantages of very promising fields, the main research directions are oriented to sustainable development of new products and applications in fields of great interest: energy, electrical engineering, medicine, automotive, by developing high performance eco-friendly materials. An important issue in the closed future will be to collaborate to the development of FAIR and ELI-NP infrastructures, mainly in the field of electromagnetic shielding. Also, another target for the next year is to finalize the accreditation of *Biomaterials Laboratory* by the *Technical Office for Medical Devices – OTDM*. A scheme of the general strategy for development is presented below.

Carbon –Ceramic Group future development strategy

Areas of research	Energy	Electrical Engineering	Structurals	Medicine	Sustainable development	Special products
Thin films photovoltaic cells type CdS/CdTe	x	x			x	x
Electromagnetic wave absorbent and shielding materials		x	x		x	x
Lightweight composite materials and structures (carbon fiber, carbon nanotubes based structures)	x	x	x	x	x	x
Carbon/ceramic nanocomposites resistant to aggressive environments (high temperature, corrosion, erosion)	x	x	x	x	x	x
Coating technologies and surface engineering	x	x	x	x	x	x
High conductive carbon fiber manufacturing	x	x	x	x		x
Biocompatible, bioactive and bioresorbable materials			x	x	x	x
Materials for portable power sources (batteries, fuel cells)	x	x	x		x	x
Nanomaterials (carbon nanotubes, graphene, ceramic nanopowders)	x	x	x	x	x	x

Team 4

Self Assessment Report 2007 – 2011 Renewable Energy Sources and Energy Efficiency

This team is a part of ECCE Department (Department for Efficiency in Conversion and Consumption of Energy).

I. QUALITY OF THE RESEARCH ACTIVITY

A. The results obtained after the completion of the contracts won during 2007 – 2011

Table 1. The results obtained after the completion of the contracts won during 2007 – 2011

	2007	2008	2009	2010	2011
ISI Papers	2	1	1	5	1
Relative Influence Score	0,2992	0	0	0,3764	0,2268
Impact Factor	1,386	0,154	1,346	4,170	0,477
Citations	1	0	3	1	0
B, B+ Journals	4	6	8	11	0
International conferences with program committee	12	7	7	5	1
International communications	5	0	5	5	5
Awarded patents	3	1	0	1	2
Patent applications	0	1	2	4	4
Products	1	2	0	7	4
Technologies	1	1	0	2	1
Procedures	1	1	0	1	1

B. Number of publications developed in partnership with foreign partners: 8

C. Directions of research:

- The use of renewable energy sources (wind energy conversion, hydraulic energy conversion, wave energy conversion, solar energy conversion) for electrical power generation;
- The increase of electric machines' energy efficiency for various industrial applications;
- Applications of hydraulics and fluid mechanics in order to optimize the consumption in industrial processes and environmental protection;
- Applications of cryo-electrotechnics and superconductivity for the efficiency of energy conversion and consumption;
- Micro-grids and smart grids.

D. Actions undertaken in order to increase the research visibility:

- 2009 - Co-organizers - National Conference of New and Renewable Energy Sources 2009, Bucharest, 6-9 October 2009;
- 2009 - Organizers - 1st Workshop "Innovation and Evolution by R&D – SMEs Strategic Partnership – 2009, Bucharest, 10-12 September 2009;
- 2009 - Co-organizers - Science Show - Science Show in Bucharest in the framework of the European event of Researchers' Night, Bucharest, 25 September 2009;
- 2008 - Co-organizers - Conference of New and Renewable Energy Sources (CNSNRE 2008), Bucharest, 23-25 October 2008

E. Awards for the research activities carried out during 2007 – 2010

2010 - AGIR 2009 Award in the field of “Electrical Engineering” for the paper “Assimilation in the industrial production of a series of synchronous generators for micro wind turbines”;
2007 – 1st Award of ANCS in the field of “Energy” for the research project entitled: “Hydroelectric systems for renewable energy conversion – storage – distribution designed for ecological river transport service for the protected port waters”; Project Manager: Nicolaie Sergiu;
2007 – 3rd Award of ANCS in the field of „Environment and Climate Change” for the research project entitled “Hydro gaso-dynamics and mass transfer in fine bubble columns applied in advanced environmental technologies”; Project Manager: Băran Gheorghe.

F. Medals earned at national and international exhibitions of inventions

2009 – Silver Medal at the International Inventions Show – Geneva 2009, for “*Electrical machines with permanent magnets in special arrangements*”; **2009** – Special Award at the International Inventions Show – Bucharest 2009, for “*Double excited electric machine*”; **2009** – Gold Medal at the International Inventions Show – Bucharest 2009, for “*Double excited electric machine*”; **2009** – Bronze Medal at the International Inventions Show – Bucharest 2009, for “*Wave channel for researches*”, **2009** – Bronze Medal at the International Inventions Show – Bucharest 2009, for “*Laboratory equipment for determining the hydrodynamic characteristics of bubble diffuser*”, **2009** – Gold Medal at the International Inventions Show – Brussels 2009 for “*Double excited electric machine*”, **2008** - International Inventions Show – Bucharest – International Jury 2008 for “*Process and device for dynamic balancing with coupling and magnetic sustentation*” ; **2007** – Silver Medal: Eureka, 24 November, 2007, The Belgian And International Trade Fair for Technological Innovation, for the invention: “*Electromagnetic pulse generator with concentration field*”; **2007** – Silver Medal: International Inventions Show – Geneva 2007 for “*Process and device for dynamic balancing with coupling and magnetic sustentation*”; **2007** – “ARCA” Medal - Zagreb 2007 – for the invention “*Multiple axial coupling with permanent magnets*”, **2007** – Gold Medal at the International Inventions Show EUREKA Brussels 2007, for the invention “*Multiple axial coupling with permanent magnets*”.

G. The economic and financial situation of the department in the period of 2007 – 2011

Table 2. The economic and financial situation in the period of 2007 – 2011

	2007	2008	2009	2010	2011
Revenues from research and development contracts funded by the national state budget (lei)	1630465.04	1610465.04	2113470.95	3982130.95	1410047.91
Revenues from international research and development contracts (lei)	-	-	-	-	-
Revenues from direct contracts and services (lei)	-	-	-	77020.35	52500
Total revenues	1630465.04	1610465.04	2113470.95	4059151.3	1462547.91

II. HUMAN RESOURCES QUALITY

A. Personnel Structure

In 2011, the personnel structure is allocated as follows:

- (1) Certified research personnel: 8.5.
- (2) Research assistants: 5.
- (3) Not certified personnel: 2

Researchers (CS1-CS) / Technological Development Engineers (IDT1-IDT):
 Nicolaie Sergiu - IDT1, Mihaiescu Gheorghe - IDT1, Dobrin Ion - CS2, Chirita Ionel - IDT2; Pîslaru-Dănescu Lucian – IDT2, Oprina Gabriela – CS3; (1/2) Bunea Florentina – CS3; Marin Dorian - CS3; Nedelcu Adrian – CS;

Research assistants:
 Stoica Victor – ACS; Tanase Nicolae – ACS; Mitulet Andreea – ACS; Rareş Chihaia – ACS, Dan Daniel –ACS;
 Technical auxiliary personnel: Sub-engineers/ Technicians/ Workers: Miu Marius – T.P, Sorescu Florea – M

Table 3. The evolution of personnel structure

	2007	2008	2009	2010	2011
Specialists (CS, IDT)	16	18	18	21	21
ACS	1	1	1	2	6
Sub-engineers	2	2	2	2	2
Technicians, workers	3	3	3	3	3
Total number of personnel:	22	24	24	28	32

Table 4. The evolution of young personnel (under 35 years)

	2007	2008	2009	2010	2011
Young persons with age under 35 years	6	5	6	7	11

Table 5. The evolution of the personnel distribution by gender

	2007	2008	2009	2010	2011
Men	14	16	16	19	21
Women	8	8	8	9	11

B. Average age of the personnel: 40.4

C. Areas of expertise: renewable energies (wind, hydropower, solar); electrical machines; electric networks and circuits; cryogenics; superconductivity; particle accelerators and design.

D. Ability to attract young people with high education: 5 young persons with ages under 35 years hired in the period of 2009 – 2011: Nedelcu Adrian – CS (2010); Tanase Nicolae – ACS (2010); Mitulet Andreea – ACS (2011); Rareş Chihaia – ACS (2011), Dan Daniel –ACS (2011).

III. Strategic direction for the research group.

The research activities will be improved in all the classical research directions (presented at point I C) of the department: the use of renewable energy sources (wind energy conversion, hydraulic energy conversion, wave energy conversion, solar energy conversion) for electrical power generation, the improve of electric machines' energy efficiency, applications of hydraulics and fluid mechanics in order to optimize the consumption in industrial processes and environmental protection. Also, it will a special attention for the last research direction developed in our department (cryogenics, super conductivity, smart grids, in order to increase the energy efficiency of the industrial process).

All our research activities will follow the national strategy in the field of energy and energy research direction of EU, too.

Team 5

Self Assessment Report 2007 – 2011 Electrochemical and Bio Technologies

This team is a part of ECCE Department (Department for Efficiency in Conversion and Consumption of Energy).

I. QUALITY OF THE RESEARCH ACTIVITY

A. The results obtained after the completion of the contracts won during 2007 – 2011

Table 1. The results obtained after the completion of the contracts won during 2007 – 2011

	2007	2008	2009	2010	2011
ISI Papers	6	9	9	5	2
Relative Influence Score	1,5193	1,1938	0,7291	1,1172	0
Impact Factor	6.927	6.072	8.013	4.43	1.219
Citations	22	7	1	1	0
B, B+ Journals	4	6	8	5	0
International conferences with program committee	24	22	23	12	4
International communications	1	5	7	2	3
Awarded patents	0	2	0	0	0
Patent applications	0	2	2	4	3
Products	0	0	0	3	0
Technologies	0	0	0	0	0
Procedures	1	4	0	1	0

B. Number of publications developed in partnership with foreign partners: 3

C. Directions of research:

- i. Electrochemical technologies (electrochemical deposition with functional role, anodic oxidation);
- ii. Fuel cells and integrated systems for power generation;
- iii. Materials development and testing for chemical energy storage;
- iv. Monitoring of anaerobic fermentation processes in biogas facilities;
- v. Evaluating biogas and biomass potential by physical, chemical and microbiological analysis;
- vi. The identification of new combustible materials based on vegetable oils and biodiesel;
- vii. The degradation of materials by corrosion, corrosion control in various natural and industrial environments;
- viii. Environmental electromagnetic pollution, stray leakage currents; electro-security complex systems and active anticorrosion protection of electrical cables and underground metallic conductors in order to improve the durability and reliability.

D. Actions undertaken in order to increase the research visibility:

- i. 2011 – Organizers - Green Energy – Romania & China Workshop, Bucharest, 28 – 29 June 2011;
- ii. 2010 – Co-organizers - Black Sea Renewable Energy Forum, Bucharest, 8-10 November 2010;
- iii. 2010 – Co-organizers - Science Show – Science Fair at the European Researchers' Night event, Bucharest, 25 September 2009;

- iv. 2010 – Co-organizers - National Conference for New and Renewable Energy Sources 2010, Targoviste, 29 -30 June 2010.

E. Awards for the research activities carried out during 2007 – 2010

- i. 2007 – Second Prize awarded by ANCS in the Energy field for the research project: *”Hybrid system for energy autonomy based on photovoltaic/fuel cell module”*, Project Manager: Gimi A. Rimbu;
- ii. 2007 – Third prize awarded by ANCS in the field of Environmental and climatic change for the research project: *”Hydraulic and gas dynamics, and mass transfer for fine bubbles columns with application for the environment advanced technologies”*, Project Manager: Băran Gheorghe;
- iii. 2007 – Special prize awarded by ANCS for the research project: *”Integrated conversion system for renewable energies”*, Contract 226/2006, Project Manager: Prof.dr. Ioan Stefanescu, INC-DTCI-ICSI Rm Valcea, Project Responsible: Gimi A. Rimbu (ICPE-CA).

F. Medals earned at national and international exhibitions of inventions

- i. 2010 – Silver Medal won at the International Inventions Show – Bucharest 2010, for the invention: *”Method of treating sewage sludge in order to stimulate methanogenic microorganisms activity”*;
- ii. 2010 – Silver Medal won at International Inventions Show – Bruxelles 2010, for the invention: *”Biogas plant for individual household in rural areas.*

G. The economic and financial situation of the department in the period of 2007 – 2011

Table 2. The economic and financial situation in the period of 2007 – 2011

	2007	2008	2009	2010	2011
Revenues from research and development contracts funded by the national state budget (lei)	3977262.23	3068443.39	764977.03	1160876.25	418999.22
Revenues from international research and development contracts (lei)	-	-	1698583.00	1698583.00	584852.00
Revenues from direct contracts and services (lei)	-	7169.79	-	102224	-
Total revenues	3977262.23	3075613.18	2463560.03	2961683.25	1003851.22

II. HUMAN RESOURCES QUALITY

A. Personnel Structure: 11 persons

At 2011, the personnel structure is allocated as follows:

- (1) Certified research personnel: 9.
- (2) Research assistants: 1.
- (3) Not certified personnel: 1

- a. Researchers (CS1-CS) / Technological Development Engineers (IDT1-IDT): Rîmbu Gimi Aurelian – CS1 (2010); Băran Gheorghe – CS I; Petica Aurora – CSI; Lingvay Carmen - IDT1;

Bunea Florentina – CS3; Mateescu Carmen - CS3; Mirea Radu – IDT3 (2010); Babutanu Corina – CS; Iordoc Mihai – CS (2010); Paula Prioteasa – CS (2010).

b. Research assistants: Nicula Nicoleta –ACS (2011).

c. Technical auxiliary personnel: Sub-engineers / Technicians / Workers: Salaoru Angela – s.i.

Table 3. The evolution of personnel structure

	2007	2008	2009	2010	2011
Specialists (CS, IDT)	6	6	7	10	9
ACS	0	0	0	0	1
Sub-engineers	1	1	1	1	1
Technicians, workers	0	0	0	0	0
Total number of personnel:	7	7	8	11	11

Table 4. The evolution of young personnel (under 35 years)

	2007	2008	2009	2010	2011
Young persons with age under 35 years	1	1	2	4	5

Table 5. The personnel distribution by gender

	2007	2008	2009	2010	2011
Men	1	1	1	4	4
Women	6	6	7	7	7

B. Average age of the personnel: 41

C. Areas of expertise:

- Electrochemical energy conversion:** new combustible materials, hydrogen storage and fuel cells, electrochemistry – 3 persons (**G. A. RIMBU**, **M. IORDOC**, **R. MIREA-VASILESCU**);
- Biochemical Energy Conversion (biogas/biomass)** – 5 persons (**C. MATEESCU**, **F. BUNEA**, **C. BABUTANU**, **G. BARAN**, **N. NICOLA**);
- Electrochemical Technologies for Energy Efficiency** – 4 persons (**C. LINGVAY**, **A. SALAORU**, **P. PRIOTEASA**, **A. PETICA**)

D. Ability to attract young people with high education: 1 person / year (young persons with the age under 35 years hired in 2011 - Nicula Nicoleta –ACS).

III. STRATEGIC FUTURE DIRECTION FOR THE RESEARCH GROUP

The research activities will be improved in all the classical research directions (presented at point I C) of the department: of fuel cells and integrated systems for power generation, anaerobic fermentation processes, degradation of materials by corrosion, corrosion control in various natural and industrial environments. Also, it will be given a special attention for the last research direction developed in our department (application and testing of new materials for chemical energy storage, the identification of new combustible materials based on vegetable oils and biodiesel in order to increase the energy efficiency of the industrial process).

Self Assessment Report Micro and nanoelectrotechnologies MNE

Contents

Traditional *performance measurement activities* in research is emphasized on the application of clearly defined performance measures to evaluate process or organizational performance outcomes. Measures such as *workforce diversity, published papers, patents received, finalized research projects or funds gained* to sustain research, are some examples by which performance measures can be used in the R&D environment. In this view a self evaluation report regarding MNE dep activities is presented.

✚ Criteria for Projects Funding

The following criteria have been applied for funded projects:

Mandatory Criteria

- Clear objectives, oriented towards specific issues or problems within the scope of Programme.
- Demonstrated need for R&D results
- Relevance to regional development priorities, such as economic policy, gender equity, environment, education, social development
The targeted beneficiary groups were clearly identified.

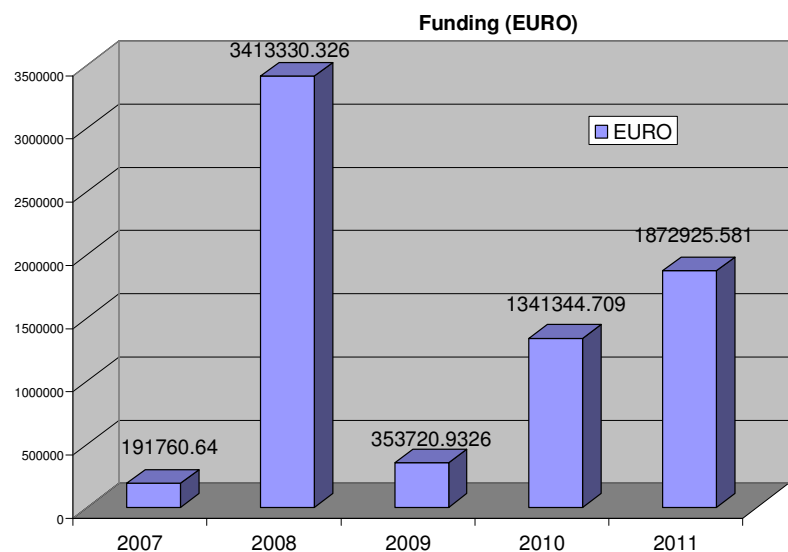
Other Criteria

- Originality of the proposed R&D project, and assurance that it is not already being undertaken elsewhere.
- Leverage of existing techniques and technologies to produce innovative practical solutions rather than original "ground-up" development or basic research work
- Reliability of the application of R&D results, showing potential for use eventually in other countries

✚ Overview of PROJECTS Funding (2007-2011) of MNE department

Future power electronics, motion control, and communication devices require high efficiency with highly compact and low-cost passive components such as capacitors, inductors, resonators, and relays. At the MNE dep. we are exploring microtechnology components that will enable future power electronic and electromechanical systems. Micromachining technology has undergone rapid development during the past decade and has been successfully applied to a number of sensors and actuator products. MEMS devices are being applied in radical ways to energy conversion processes. Majority of the approached research projects deal with the mentioned

Projects Research Category	Energy and Environment
	Advanced materials
	Transportation
	Microelectromechanics
	Electrical engineering



✚ Representation in International Project/Agreements:

Representation in Management Committee for UE COST Actions:

UE/COST Action D43 (2006-2011): Colloid and Interface Science for Nanotechnology

UE/COST Action CM1101 (2011-2016): Colloidal Aspects of Nanoscience for Innovative Processes and Materials

Management for (PhD. Jenica Neamtu – Project Manager) for:

Collaboration - **CNRS France**- Romanian Academy: Structures Magnétiques Hybrides: Couches Minces Métalliques et d'Oxydes - Effet Vanne de Spin et Tunnel

Collaboration - **CNRS France**- Romanian Academy: Couches Minces de Semiconducteurs Magnétiques Dilués
Obtenus par Méthode Sol-Gel

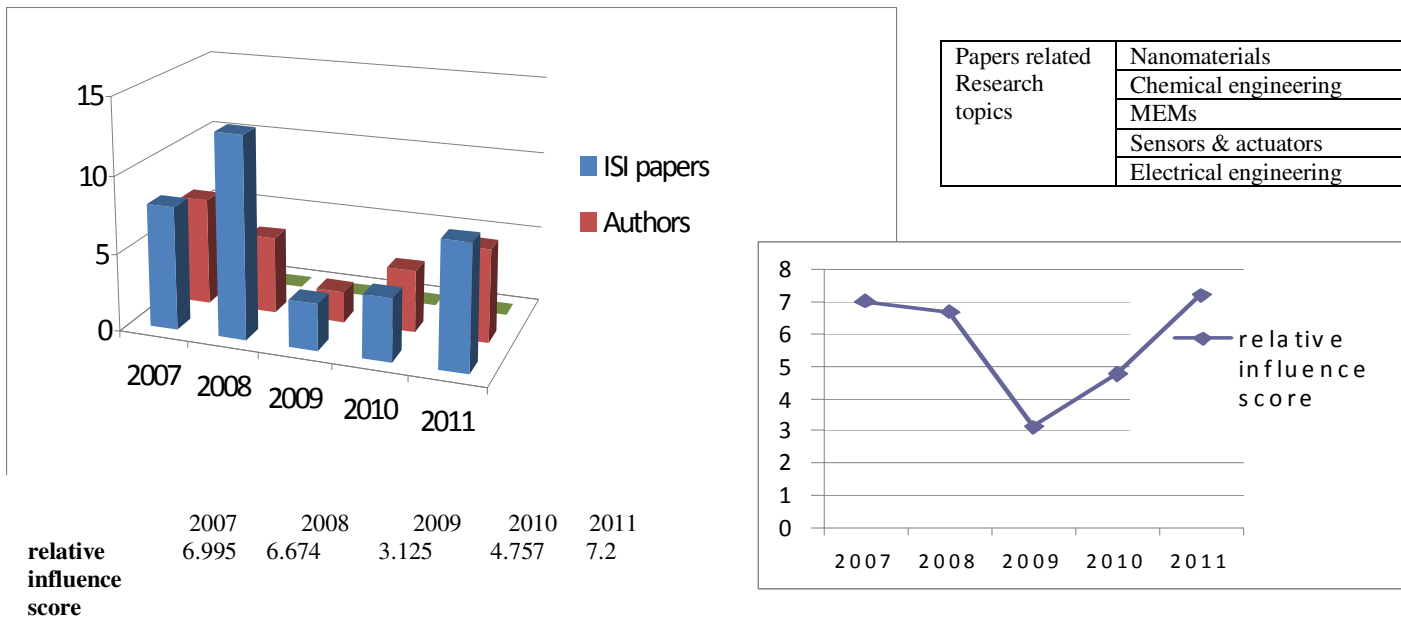
Partners in ERANET framework CROSSTEXNET (2011-2012) project entitled: "Research and development of new functionalities for sports and health garments" in the field of "New technologies for the production of high added value and

multifunctional textiles (nanotechnology, biotechnology, nano-biotechnology, surface treatment technologies, electronics integrated in the textile structures, etc.)”.

Papers (ISI)/Patents/Awards/Thesis

	2007	2008	2009	2010	2011
ISI papers	8	13	3	4	8
International symposia/conferences	19	23	16	15	6
Patents proposals	3	2	3	2	2
Patents awarded	-	1	3	-	-
PhD. Theses		2			1

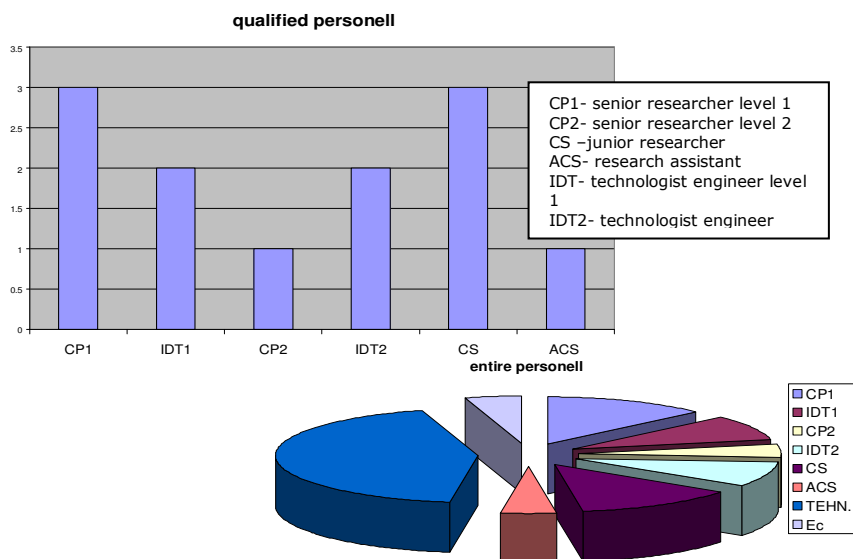
- PhD. Theses:
1. Inorganic materials with electrical properties.
 2. Oxide systems from complex precursors. Applications.
 3. Piezoelectric micromotors designed for nonconventional drive systems.



MNE department promoted and handle from 2011 the redaction staff for *Bulletin of Micro and nanoelectrotechnologies*, ISSN 2069-1505.

MNE department PERSONELL

MNE group is well balanced being composed of 25 members (from which 5 PhD.): senior researchers level 1: 3 members, senior researcher level 2: 1 member, junior researchers: 3 members, research assistant: 1 member, technologist engineer-level 1: 3 members, technologist engineer level 2: 2 members, laboratory technicians: 10 members



Research capabilities: (the above equipments have been purchased during 2007-2011)

PONTOS Dynamic Measuring System - It is a completely non-contact system that allows capturing 3D positions of the markers found in the field of volume measurement. Replaces classical kinematics analysis, using accelerators or displacement transducers.

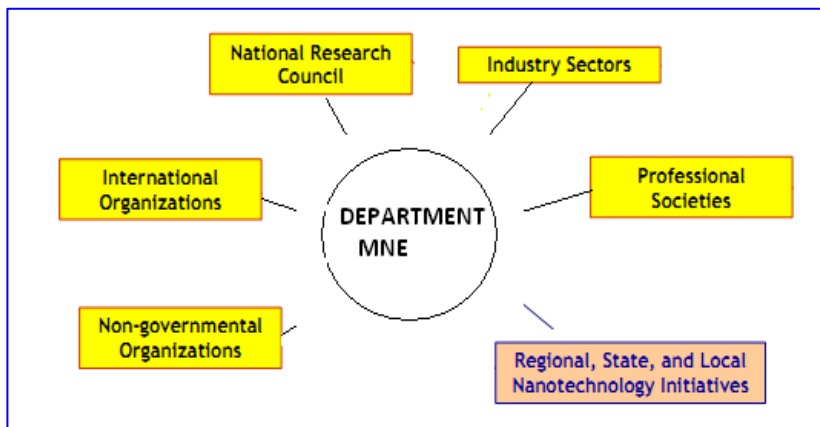
ATOS – 3D Digitizing System, Laser interferometer, Agilent 10766A, **Magnetron Sputtering Deposition System** Generator Rigol DG 1010, 15 MHz, 100 Msa/S, **Oscilloscope** Fluke 196B 100 MHz, 1GS/s, PROGRAMMABLE DC POWER SUPPLY MOTTECH LPS 505N 3 channel (32V/3A; 32V/3A;15V/5A), METREL MI 2092 **POWER HARMONIC ANALYSER** , METREL MI 2077 TERAOHM 5kV , 382091: 1000A 3-Phase Power Analyzer/Datalogger (50 Hz), Tahometer – UNITEST rotaro BEHA – Germany, Anemometer meter, air flow + air temperature air velocity with RS-232C Model: AVM-712 TECPEL712 – Taiwan, Megometru model 1026 – Taiwan – 250-500-1000V AENC Instruments, **Torque Meter** 840062 SPER SCIENTIFIC USA, **Vibrometer** VM110 MONITRAN – England

MNE department LINKs

- **Professional Societies:**

IEEE-SUA – Section Biomedical Engineering (Section Energy Power and Section of Science History)

- **Non-Governmental Organizations:**



Solidaritatea Universitara

National Committee of World Energy Council

- **International Organizations**

The University of **Texas Pan American**, Physics and Geology Department, **University of Southampton**, SUA, **Deft University**, **Hokkaido University/Riken Advanced Sciences Institute**, **Technical University of Lodz/ University of Pisa**

- **Industry Sector:**

Agreements/contracts with: MLS ELEBE 1992, S.L (LURBEL),SPAIN, S.A DE TINTES SANZ (SATINSA), Spain, MAGNUM SX S.R.L –Romania, ENDRA SA-Romania, SC ROSEAL Odorheiul Secuiesc - Romania.

- **Regional State and Local Nanotechnology Initiatives:**

MNE department had the initiative to gather and originate a group of professionals having as main objective standardization in the field of nanotechnologies. This group became internationally recognized as **CT378-Nanotechnologies** (Technical Committee for Nanotechnology) being a mirror committee for CEI: IEC_TC113, CEN:CEN/TC352, ISO:ISO/TC229

Research topics in Development:

1. Energy Harvesting for Self-Powered, Ultra-Low Power Microsystems with a Focus on Vibration-Based Electromechanical Conversion

Our **focus relay** on generating electrical power from mechanical energy in a vibrating environment due to its dominant scalability. We explore microelectromechanical systems (MEMS), including electromagnetic, electrostatic, and piezoelectric transduction. Further, power management, trends, suitable applications, and possible future developments are discussed.

2. EXPERIMENTAL TECHNIQUES FOR MEASURING VIBRATIONS based on LASER INTERFEROMETRY:

Apparently novel experimental techniques for measuring vibrations by use of a laser interferometer are evaluated. Schemes for obtaining accurate, absolute measurements of displacements less than 100 Å, such as used in calibrating accelerometers, are considered as well as are methods of scanning a vibrating surface in order to obtain its dynamic displacement profile, as is often desired in acoustic radiation studies. The effect of intensity fluctuations of the light source, variations of the medium in the optical paths, background vibrational noise, and other phenomena are evaluated by comparison of the theory with measurements.

3. NANOMATERIALS/NANOCOMPOSITES/NANOPARTICLES: Further development of **Passive nanostructures** (ex: Nano-structured coatings, nanoparticles, nanostructured metals, polymers, catalysts, composites) and **Active nanostructures** actuators, adaptive structures, sensors, high performance nanocomposites).

Team 7

SELF-ASSESSMENT REPORT Prototypes Team

The activity of the prototypes group is based on the experience and professionalism of the working team which is consisted of 16 persons, including: two Ist degree technological development engineers, one IInd degree technological development engineer, one IIIrd degree scientific researcher, seven technicians and five workers.

The main available equipment for developing projects for customers both within as well as from outside the institute are:

- Equipment for mechanical processing (lathes, mills, planers, CNC processing centers, etc.);
- Processing equipment using unconventional technologies (laser station, laser lithography, electro-erosion, plasma, etc.);
- Processing equipment for permanent magnets (preparation and heat treatment furnaces, blenders, ovens, grinding machine, electro-erosion, etc.);
- Processing equipment for electrical contacts (ball mixers, crushers, granulometers, presses, ovens, sintering furnaces with controlled atmosphere, extruders, drawers, plasma sintering equipment, etc.);
- Processing equipment for electric brushes (mixers, mills, homogenizers, sieves, baking and sintering ovens, graphitization furnace, impregnation utility, press, etc.);
- Processing equipment for ceramic materials (mills, press filter, extruders, ovens, mixers, hot molding machine, etc.).

In terms of performed activity, this group was focused on the participation in research contracts orientated towards applied research, technological development and achievement of micro-production contracts which finally resulted in the obtaining of finished parts, assemblies and prototypes and their transfer to customers both within and outside the institute.

Related activities were added over time to these activities, like the participation in workshops, conferences, symposiums and scientific meetings designed to promote the institute's activity, invention patents' application, the main results published in trade journals.

In quantitative terms, in the year of 2008, the Prototypes Group portfolio included three research projects financed by the national programs, there has been a participation in three scientific events in the field of inventions, one at national level and two abroad, where there have been won as many awards as inventions and has been submitted a patent application.

In 2009, the Prototypes Group portfolio included five research projects financed by the national programs, of which two themes on Nucleus program, there has been a participation in six scientific events in the field of inventions, four at national level and two abroad, where there have been won three awards and has been submitted a patent application. Following the results that were obtained, there were published two articles in professional journals.

In 2010, the Prototypes Group portfolio included three research projects financed by the national programs, of which two themes on Nucleus program, there has been a participation in five national scientific events and there have been submitted two patent applications. Following the results that were obtained, there was published one article in a professional journal.

In 2011, the Prototypes Group portfolio included two research projects financed by the Nucleus program, there has been a participation in two national scientific events and there have been submitted two patent applications. Following the results that were obtained, there were published three articles in professional journals.

Regarding the execution activity of mechanical markers and sub-assemblies with the available machine tools, there resulted the following: 52 orders honored in 2008, 49 in 2009, 34 in 2010 and 45

in 2011. Their value was about 106,000 lei in 2008, 40,000 lei in 2009, 96,000 lei in 2010 and 110 000 lei in 2011.

Regarding the execution of permanent magnets, heat treatments and the obtaining of magnets, there were achieved micro-productions of about 70,000 lei in 2008, 70,000 lei in 2009, 55,000 lei in 2010 and 50,000 lei in 2011.

Regarding the execution of brushes for electric machines, there were achieved micro-productions of approximately 66,000 lei in 2008, 63,000 lei in 2009, 20,000 lei in 2010 and 84,000 lei in 2011.

Regarding the execution of electrical contacts, there were achieved micro-productions worthing about 127,000 lei in 2008, 81,000 lei in 2009, 36,000 lei in 2010 and 14,000 lei in 2011.

Regarding the execution of ceramic components, there were achieved micro-productions worthing about 92,000 lei in 2008, 43,000 lei in 2009, 28,000 lei in 2010 and 23,000 lei in 2011.

In this way were settled the requirements of more than 35 companies, among which mention: UTIS Industries, ROSEAL Odorheiu Secuiesc, ICMET Craiova, ASTRA Vagoane, IAME Group, Electromagnetica, GENA Electric, FEPA Barlad, ICPE SA, etc.

The work portfolio is consisted of research contracts developed in the frame of both national programs as well as Nucleus program, which represent the financing base of the institute. Some of the contracts which develop activities were coordinated by the members of the Prototypes Group (Marius Popa, Dumitru Strambeanu, Cristinel Ilie, Iuliu Popovici), while the other activities represent applications of other colleagues within the institute.

Among the remarkable achievements, we mention the development of a “Stand for running and testing electrical machines up to 1500 kW used in railway traction”, in the frame of the research contract no. 87 / 2007, carried out within the INNOVATION program and completed with the stand’s transfer to the customer, SC REMAR 16 Februarie. Put into operation in the year of 2009 (order 107/1594/21.10.2009), it is currently integrated in the production process of SC REMARUL Cluj Napoca.

Another remarkable achievement is the development of a “Computerized measurement and analysis system for driving profiles in order to increase the safety of the guiding and the quality of the running service” in the frame of the research contract no. PN II 71-052/2007 carried out within the National Partnerships program and also completed with the product transfer to the customer, SC Atelierele Grivita SA, in 2011.

We emphasize that the equipment’ achievement for the two customers was accompanied, during the contracts’ performance, by the dissemination of results at conferences within the field and an invention patent application.

It is important to note that, vis-à-vis micro-production contracts (in the field of mechanical processing, permanent magnets execution, brushes for electrical machines, electrical contacts and ceramic components) which involve a highly specialization in the field, specialists from various fields (mechanics, electrics, electronics, programming) were involved in order to produce equipment in the frame of the mentioned research contracts, the contracts having a strong interdisciplinary character.

Among the remarkable achievements of the mechanical processing workshop, we mention the attaining in 2008 of a wave channel experimental model for research and of a micro-generator after which there was filled a patent application (No. 000115/2009). Other remarkable achievements of 2008 were the development of a hydro electric generator and of a three-dimensional measuring device, an antenna orientation system and a general Helmholtz wounded assembly.

Among the achievements of 2009, we mention the following works execution: magnetizer, Cryostat, three axis measurement sextupole system, markers for power plant wave powered.

Among the achievements of 2010, there are included: material testing superconducting cell, super spherical magnet assembly, wind generator rotor subassembly, Micro generator D6mm.

In 2011, there were executed components and subassemblies especially for the Nucleus program themes developed among which we mention the superconducting coil cryogenic enclosure, planetary micro decelerator, high speed synchronous machine with permanent magnets, etc.

In terms of dynamics of the research activity, we have tried, in the recent years, with substantial investment and contribution (the value of the processing equipment purchased in the last four years exceeds 1 million EURO) to increase the technical and work degree of our products. For this purpose, we have focused our activity to high value-added areas, micro processing, microstructures and their integration in MEMS systems. The products obtained in this field are addressed primarily to the top areas of the world economy, medicine, MEMS systems, optics, military applications, etc. In this respect, we have purchased, among other advanced equipment, a high precision processing center KERN Micro type, able to work with tools up to 0.01 mm diameter. In addition to these, we own the excimer laser Koherent type with ablations capable of micrometer order.

In support to this tendency, there was accessed and earned a contract (58/cpI/2007) after which our institute has developed a new “Laboratory designed for mechanical microstructure processing, using LIGA technology “. We mention that we are the only institute which owns such a technology at national level having a top position in the field of micro processing as well. Unfortunately, we are not yet well known on the market regarding our processing abilities.

Special consideration should be paid to the policy related to the group personnel. As you can see, the average age exceeds 50 years so younger persons must be employed as urgently as possible that can take over the tasks of those who will soon retire. A first step in this direction was made in 2011 by hiring a young person, Dan Cristian Neagu, on a worker position. Another problem that we are facing is the lack of specialized personnel with medium education. We plan to hire operators on the numerical command machines, but we have not yet found the appropriate personnel.

Team 8

SELF-ASSESSMENT REPORT 2007-2011 Technological Transfer Centre (CTT). Intellectual Property

In the period 2007-2011 *Technological Transfer Center. Intellectual Property* conducted and completed 4 projects of technology transfer:

- manufacturing technology of carbon materials (EGR, BGR, CDR, MGR) using other sorts of graphite than that product to Ramnicu Valcea and graphite sort correlation with other raw materials;
- technology for replacement of lead in MGR recipes.

These two technologies were transferred to SC ROFEP SA Urziceni and led to increased sales volume of over 540,000 €.

- technology to obtain composite material carbon/ceramic for volume resistors;
- transfer of knowledge and skills on design of magnetic circuits of magnetic couplings for pumps with losses “zero”

The customer of these two transfers was SC ROSEAL SA Odorheiu Secuiesc. The economic effects of these two transfers have resulted in sales of over 49,000 €.

- transfer of knowledge and skills on “Integrated system for research management EXMAN 3.W.3-07 ICPE-CA” at INMA Bucharest;
- transfer of technology to produce high-energy NdFeB magnets protected electrochemical and establishing a spin-off SC ROMNEOMAG SRL, that has implemented the technology.

In the mentioned period we participated in two missions of exchange experience in Germany/Austria and Germany/Norway/Sweden. Missions were organized in partnership between NASR Romania and Zentrum fur Innovation und Technik from Germany. Exchange experience consisted of visit at technology transfer entities from these countries and information on how they operate and are funded. Were also presented ways of collaboration between researches centers/universities and SMEs, but also ways to exploit intellectual property rights.

Actions to increase visibility in this period consisted in participation on all stages of Innovation Caravan, opportunities which were presented innovative products developed in INC DIE ICPE-CA, but also opportunities for collaboration between the institute and business.

Also, *Technological Transfer Center. Intellectual Property* staff participated in a series of Regional Research Shows organized by Chambers of Commerce and Industry of Timisoara, Bacau, Calimanesti, Slobozia with support of NASR.

In order to facilitate the technology transfer was designed three procedures: for patents evaluation, for technology transfer methodology, respectively steps are taken for technology transfer and the last the file composition of a technology that sets the information to be provided to initiate a transfer of technology.

In another context, through efforts undertaken by *Technological Transfer Center. Intellectual Property*, INCDIE ICPE-CA became a partner in the cluster ETREC (ElectroTechnical REgional Cluster), built around the enterprise Electroprecizia Sacele and has as important partners University Brasov, Regional Development Agency, Brasov County School Inspectorate, Sacele Hall.

Thus INCDIE ICPE-CA is in a close collaboration with the economic environment, knowing closely the needs of developing of core enterprise.

Representative project

A representative project was the implementation at SC ROFEP SA Urziceni of the manufacturing technology of carbon materials (EGR, BGR, CDR, MGR) using other sorts of graphite than that product to Ramnicu Valcea and graphite sort correlation with other raw materials. This technology was perfected and experienced by team of Carbon Materials of INCDIE ICPE-CA.

Through the collaboration of specialist of INCDIE ICPE-CA and those of SC ROFEP SA Urziceni, was achieved the transfer of knowledge and skills to the staff working at SC ROFEP SA. In parallel with implementation of this technology, was implemented the technology for replacement of lead in MGR brushes; these brushes is required by Dacia Renault manufacturer cars.

Experimental batches of electrical brushes made by SC ROFEP SA and based on the two technologies have undergone a specific test program, the results conforming that the brushes correspond to levels of quality required by users.

Team 9

SELF ASSESMENT REPORT Laboratory for Testing and Characterization of Electrical Materials and Products (CIMPE), Polymeric Materials

1.2 Staff list

Laboratory for Testing and Characterization of Electrical Materials and Products (CIMPE) was established in the INCIDIE ICPE - CA in 2004 having as main activity the provision of services characterization, tests, measurements and analysis in the field of materials and electrical products.

In 2007-2011 periods, the activity of the specialists from the laboratory was diversified by addressing of the field of polymeric materials in terms of research and development of new methods of investigation and analysis of materials based on luminescence phenomena, diagnosis and assessment of degradation of polymeric materials in different life conditions demand.

Laboratory staff includes specialists in chemistry, physics and electrical engineering, forming a team which kept a homogeneous component during the period analyzed.

Evolution staff component in terms of educational level and age distribution is shown in Tables 1 and 2 below:

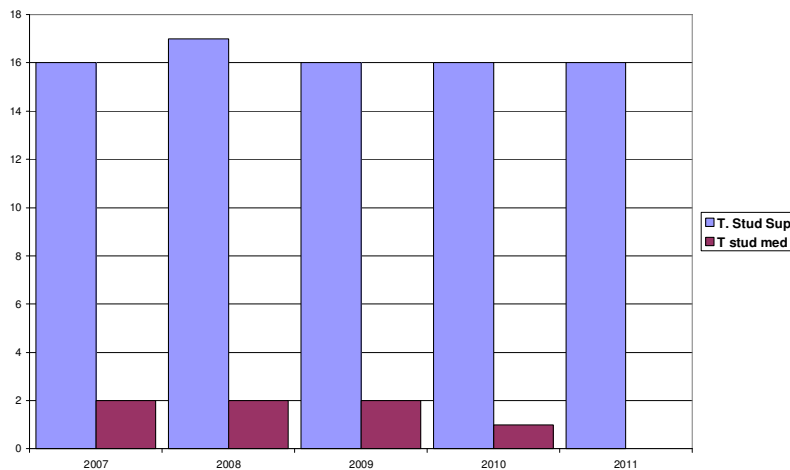


Table 1 Staff Evolution by educational level

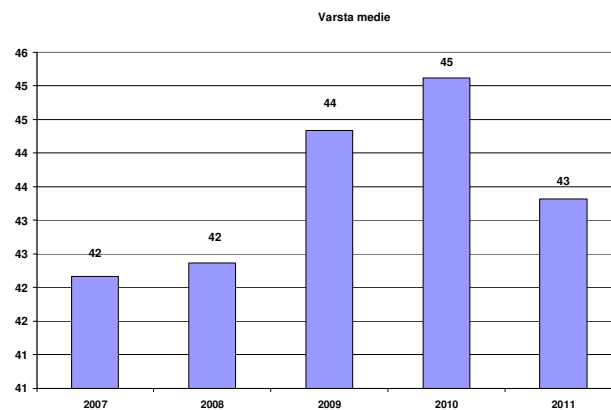


Table 2 Staff age evolution

From the tables above, a constant evolution can be observed, both in terms of number of team members (16), education level and the average age of staff (42-45 years).

2.3 Activity report by team

Due to the need that manufacturers of materials or products for electrical engineering from Romania to align, by products developing to the the imposed requirements of European standards, is required to develop elite entities in the field of characterization / testing of various new materials and products with high performances.

Performance and reliability of these products depend greatly on the quality of materials and components that come into their construction of. Given these requirements, the work carried out by the specialists of the Laboratory was focused from beginning on providing high-standard characterization services.

In this respect, since 2005, they started planning the expansion and modernization of the laboratory materials.

Since 2007, specific activities were completed with the approach of new research themes in the field of polymeric materials with new opportunities in terms of their characterization.

For optimum performance in specific activities of work crew, were been purchased and put into operation in the laboratory, nine high performance equipments for materials/products characterization namely: X-ray diffractometer D8 DISCOVER; Laser ablation mass spectrometer ELAN DRC; Micro hardness tester FM 700; Scanning tunneling microscope STM-Ntegra; Scanning electron microscope (FESEM-FIB); Wavelength dispersive X ray fluorescence spectrometer (WDXRF) - S8 Tiger, Automatic fluxer KATANAX K1, Apparatus for determining the behavior of polymeric products under heat stress, UV radiation and nuclear type LUMIPOL and Dielectric spectrometer.

The acquisition of these equipments was made exclusively by a public procurement strategy based on the criterion "best economical offer ", thus ensuring the best technical quality, which is reflected in the total cost of acquisition (which exceeds EUR 3 million). Some of these models are unique in Romania, such as "X-ray diffractometer D8 DISCOVER " provided with temperature chamber which allows the modification of network parameters and analysis of phase transformations with the temperature, in the range: -180 °C. ...+1100 °C and "Laser ablation mass spectrometer ELAN DRC "which allows qualitative and quantitative elemental analysis of samples in both solid and brought into solution.

Between 2007 and 2011, the entire material available in laboratory was served by a team consisting an average of 16 specialists, including 6 young doctoral students.

The laboratory staff is highly qualified to perform a wide range of tests/analysis on materials and components. The specialists received training courses with technical representatives of the manufacturers, courses conducted both in the own laboratory and manufacturer specific locations.

Since 2007, was been initiate the accreditation activities of the Laboratory so, in 2010, the laboratory has obtained the status of accredited laboratory (accreditation certificate no. LI 845/26.01.2010) by "RENAR".RENAR accreditation covers a total of 6 attempts, namely: the determination of the the remanence magnetization, the coercive field, the maximum energetic product, density determination, phase qualitative analysis and determination of Vickers hardness.

Between 2007 and 2011 the CIMPE Laboratory provided services of characterization, tests/analysis in both accredited and non accredited system, issuing a total of more than 350 test reports.

Also, in this period were prepared 15 test procedures, maintenance instructions and instructions for each technique work.

Besides these activities, in the aforementioned period, the staff of the CIMPE laboratory was / is involved as project manager /responsible, in a total of more than 15 research contracts. Also, all specialists from the laboratory staff are part of other research teams from Institute involved in numerous research projects that take place both within national and international programs.

As a result of research activities, laboratory specialists have participated in period 2007-2011 to a total of more than 25 National and International Conferences and have developed 74 articles published in various magazines. Of these, 64 are ISI indexed (see the annexed list).

The sixty for ISI indexed articles, summarized a cumulative influence relative score of 45, 2622, a total of 121 citations of scientific papers and a normalized number of citations in the field having value of 43,100.

An important concern of the laboratory consisted to support young specialists (both from laboratory and Institute) in preparing the PHD theses.

In the mentioned period, the most important project consisted of “Extending the range of tests carried out by laboratory for characterization and testing of materials and electrical products from INCDIE ICPE – CA”, project materialized in 2007 with laboratory accreditation. By this, the laboratory has strengthened its credibility in the economic environment, leading to obtaining of extra-budgetary funds.

For the next period, the specific activity will be focused on:

- Identifying new areas of application of characterization techniques developed with laboratory research infrastructure, in order to have access on the consortia that apply to projects such PNII, SOP, FP7, bilateral, etc.;

- Using of research results carried out in the field of polymeric materials for opening new domains that will lead to strengthening ties both with academia and economy.

Team 10

SELF-ASSESSMENT REPORT
Laboratory for Electromagnetic Compatibility

No.	First name(s) / Surname	Occupation or position held	Principal subjects/occupational skills covered
1	Mihai BADIC	Engineer	- PhD in Electrical Engineering; - Research, design and execution of electrical appliances and stands / measuring equipment / testing; - research on EMC (electromagnetic compatibility) and shielding; - coordinate scientific activity; - responsible for research programs; - Head of laboratory tests on high voltage electrical and electronic measurements.
1	Jana PINTEA	Engineer	- PhD in the field of piezoelectric materials; - electrical characterization of materials; - Electromagnetic compatibility - Standards; - Course: Evaluators / auditors for calibration, test laboratories, FIATEST Bucharest; - Lecture: ISO 13528:2005 "Statistical methods for determining proficiency inter-laboratory comparison", FIATEST Romania.
2	Cristian MORARI	Eng. Phys.	- Physics electronics, metrology; - Master - Physical electronics, metrology; - Electromagnetic compatibility.
3	Ionut BALAN	Eng. Phys.	- optics, spectroscopy, plasma, laser; - master - Physical electronics, liquid crystals, Microwave; - Electromagnetic compatibility.

Contract value

contract 20/2007 - Improving research capacity through consolidation, expansion and modernization of electromagnetic compatibility laboratory infrastructure, CEM – CEM, Value 1.95 million lei

Contract 4890/2009 - Market study in the Electromagnetic Compatibility range, value 40000 euro

Agreement 5622/1025 -2010 - study on constructive solutions and materials that will secure EMC design, construction and quality assurance of locations to be processed classified information a state secret, value: 72,697 lei

Equipment purchased

- impedance analyzer 236,228.76 lei

- vacuum oven – 9,584.26 lei

- thermal room – 87,311.37 lei

- spectrometer TPS 3000 -750,726.52 lei

- System for measuring electrical parameters ferroelectric – 440,716.74 RON

Summary project

Project: Improving research capacity through consolidation, expansion and modernization of electromagnetic compatibility laboratory infrastructure, Project value: 1,950,000 lei.

The main objective of the project is to develop a complex laboratory of the measurements, tests, research, and training in EMC and especially at high frequency RF and microwave. With this is meant to be carried out measurements and tests on materials of any kind and the type screens, disruptive electromagnetic interference and their effects on electronic devices and/or electrical, and human factors.

To achieve the primary objective the following steps were proposed development:

Stage I - Development of the capacity in the field of materials characterization in range 10Hz-40GHz;

Stage II - Acquisition of new equipments and installation of equipments in the previous stage;

Stage III - Commissioning and testing of equipment acquired;

Stage IV - Increasing the visibility and dissemination of results on the development and expansion of services in the field, purchase of equipment and accessories;

In the contract they acquired a number of devices as follows:

- impedance analyzer 40Hz-110MHz;
- oven with preliminary vacuum;
- system for measuring electrical parameters for ferroelectrics;
- thermal room;
- spectrometer TPS 3000.

With the equipment purchased, the range of laboratory testing was extensive and were developed for new types of testing procedures for:

1. The Procedure "Measurement of the temperature spectrum in the range 0-3000 °C";
2. The Procedure "Measurement of dielectric permittivity in the range 40Hz - 30MHz";
3. The Procedure "Measurement of magnetic permeability in the field of 40 Hz - 30 MHz";
4. The Procedure "Measurement of the absorption spectrum and transmittance parameters, admittance, complex permittivity and refractive index in the THz range";
5. The Procedure "Testing materials in the range THz".

Description of the equipment is found on page ICPE-CA INCDIE WEB at <http://www.icpe-ca.ro/ro/pncdi-2>.

Both devices and tests that can be performed in the laboratory bio-electromagnetic compatibility are presented on the website:

<http://85.186.242.51/lib/files/Laborator%20De%20Compatibilitate%20Bioelectromagnetica1.ppt>

Dissemination of laboratory competence was performed at "Open Gates" in June 30, 2009, when it was presented a leaflet. A second leaflet was presented the dissemination of laboratory and workshop with international participation "Evolution through Innovation and Strategic R& D Partnership - SMEs", which took place on September 12 to 14, 2009.

Through this project we aimed to:

- increase environmental or human factor in development, research and characterization of new materials for electromagnetic shielding;
- Electric and magnetic characterization of materials of any kind;
- Developing the supply of high-tech services;
- Provide a basis for research and technology for the production of protective material to electromagnetic fields, both for electrical/electronic and human factor;
- Creation of a technological characterization of materials in terms of electric and magnetic;
- Improving the market position on testes on electrical materials, components and electrical products, etc.

He also managed to attract customers to attempt to electromagnetic testing (University of Targoviste, SC AMTEL SRL Brasov).

Laboratory for Electromagnetic Compatibility has led to laboratory accreditation RENAR in June 2010. The results were purchased in articles that have been communicated and / or published in conferences and symposia proceedings:

1. J. Pinteă – „Electrical characterization of PZT ceramics using impedance analyzer method”, RopM 2009, Craiova 8-10 iunie 2009;
2. I.Balan, C. Morari, J. Neamtu, J. Pinteă, T. Malaeru, G. Gabriela – “The behavior of a human near the mobile phones”, Proceeding 5th Workshop of “Electromagnetic Compatibility” CEM, 19-21 sept. 2008, Predeal;
3. J. Pinteă, P. V. Notingher – “Piezoelectric composite materials with 2-2 connectivity”, Proceedings of Joint International Conference Materials for Electrical Engineering, Bucharest, Romania, June 16-17, 2008, pg 372-375;
4. G. Telipan, J. Pinteă, L. Pislaru-Danescu, - “Electrical properties of ferrofluid based on Fe₃O₄ obtained by co-precipitation method” – Physics Conference TIM-08, 28-29 November 2008, Timisoara, Romania;
5. I.Balan, C.Morari, J.Neamtu, J.Pinteă, E.Chitanu, A. E. Patroi – “Study of the electromagnetics shields made from the composites materials”, The 6th International Workshop of Electromagnetic Compatibility, CEM 2009, 12-14 nov, Constanta;
6. Ghe.Paltanea, V.Paltanea, E.Patroi, J.Pinteă – “A FEM Model for an anechoic chamber”, The 6th International Workshop of Electromagnetic Compatibility, CEM 2009, 12-14 nov, Constanta;
7. S. Jipa, T.Zaharescu, W.Kappel, A.Mantsch, G. Samoilescu, T.Setnescu, J.Pinteă – „MgF₂Mn detector for measurement of penetrating electromagnetic radiation”, The 6th International Workshop of Electromagnetic Compatibility, CEM 2009, 12-14 nov, Constanta;
8. J.Pinteă, C.Morari, I.Balan – “Influence of the electromagnetic waves on the biologic environment”, The 6th International Workshop of Electromagnetic Compatibility, CEM 2009, 12-14 nov, Constanta;
9. Enescu E., Lungu P., Sbarcea G., Patroi E., Pinteă J., Bratulescu A.- The influence of Cr addition on the magnetic properties of NiFe-basis nanocrystalline alloys - Metallurgy RoPM 2009, 8-11 iulie, Craiova,
10. J.Pinteă – „Electrical characterization of PZT ceramics using impedance analyzer method”, 4th International Conference on Powder Metallurgy RoPM 2009, 8-11 July, Craiova;
11. J.Pinteă – “Electrophysical properties in PZT type Cerami”, 1st International Workshop “Innovation and Evolution by R&D-SMEs Strategic Partnership, Bucharest, Romania, September 10-12, 2009;
12. J.Pinteă, C.Morari, E. A.Patroi – „The bio-electromagnetic compatibility laboratory of INCIDIE ICPE-CA Bucharest”, International Symposium „Environment and industry”, SIMI 2009, Bucharest, 28 – 30 October 2009;
13. J. Neamtu, I.Balan, C.Morari, J.Pinteă, E.A.Patroi, I.Iordache, T. Malaeru, G.Georgescu – „Shielding properties for composite materials”, BRAMAT International Conference on Materials Science & Engineering, 26 – 28 February 2009, Brasov;
14. J. Pinteă, C. Morari, I. Balan – „Studii privind absorbtia microundelor in ecranale electromagnetice - Probleme actuale ale mediului, interdependenta factorilor de influenta biotehnologici, industriali si economici (*Studies of absorbing microwave radiation in electromagnetic shields*)”, NATURA - ECON 2009, Sfantu Gheorghe, Romania, vol. 1, 212-216, Ed. Presa Universitara Clujana, pg. 212 – 216, ISBN 9789736109072;
15. I.Balan, C.Morari, J.Pinteă, E.Chitanu, I.Iordache – „Electromagnetic wave propagation in a material”, 7th International Workshop of Electromagnetic Compatibility CEM 2010, Odorheiu Secuiesc – Romania, 2 – 4 September 2010
16. J.Pinteă, I.Balan, C.Morari, M.Codescu, F.Radulescu – „Properties of composite materials based on epoxy resin and metal for electromagnetic shielding”, 7th International Workshop of Electromagnetic Compatibility CEM 2010, Odorheiu Secuiesc – Romania, 2 – 4 September 2010
17. E. V.Stoian, C. Z.Rizescu, J.Pinteă, Z.Bacinschi, C. M.Enescu – „Materials for filtering of electromagnetic waves”, Proceedings of the 3th International Conference on Environmental and geological Science and Engineering, Included in ISI/SCI Web of Science and Web of Knowledge, Universitatea Maritima Constanta, 3-5 Sept., 2010, pg. 163-168, ISSN 1792-4685, ISBN 978-960-474-221-9

Forecast

- co-operation agreements with several national entities (i.e. UTI - Bucharest);
- extension of laboratory for electromagnetic compatibility;
- attract more customers;
- Acquisition of new equipment and installation of equipment.

Team 11

SELF-ASSESSMENT REPORT
Laboratory for determination of thermal behavior of the solid products and materials by thermal analysis methods

Activity report

Research subjects and directions. The most important achievements

In the previous 4 years, the main objectives of “*Laboratory for evaluation of thermal behavior of products and materials*” were:

- basic and applied researches concerning the materials and products characterization by thermal analysis methods;
- creation and development of an accredited service of thermal analysis.

Fundamental and applicative researches concerning the materials and products characterization by thermal analysis methods

The investigated research domains were:

- a. Elaboration and checking of specific methods for thermal characterization of materials and products by techniques of thermal analysis;
- b. Development of new methods of non-isothermal kinetics, for increasing of accuracy of thermal and thermo-oxidative stability determination and, implicitly, for rapid prediction of materials and products thermal lifetime;
- c. Investigation of collagen based biomaterials (pure collagen, pharmaceutical products based on collagen) with medical applications;
- d. Investigation of materials from patrimonial objects (parchments, leathers, woods, mortars, plasters, pigments) for determination of their deterioration and the objects authentication.

The main obtained results were:

- elaboration and checking of some methods of thermal analysis of materials and products from the following classes: coordinative compounds with application in glass production and medicine, ceramic materials, polymers and polymeric materials used in electro-technical industry, energy production, biomaterials used in drugs preparations;
- elaboration and checking of two genuine isoconversional methods and a general algorithm for evaluation of the non-isothermal kinetic parameters, which are useful for rapid prediction of the thermal lifetime of materials and products that is necessary in planning and achievement of equipments ,e.g. electrical equipments;
- characterization by thermal analysis of some collagen biomaterials utilizable as pharmaceutical products;

- elaboration of some procedures for: authentication of the cultural and historic objects manufactured from leather and/or wood; thermal characterization of mortars, plasters and pigments; checking of some methods used for assessment of the deterioration degree of patrimonial materials; determination of the environmental effects on the patrimonial materials; evaluation of the effects of conservation and restoration effects on these materials.

These investigations were objects of 8 research projects and the obtained results were published in some ISI journals (37 papers in: Journal of Thermal Analysis and Calorimetry, Thermochemica Acta, Polymer Degradation and Stability, Journal of Electroceramics, Polymer Bulletin, Journal of Non-crystalline Solids, Revista de Chimie) and communicated in some Conferences and Symposia.

The methods of materials characterization by thermal analysis methods are necessary for quality control and are involved in production of many industrial equipments and products: electric devices, classic and nuclear energy plants, glass objects, drugs, etc.. By this, the performed researches exhibit an economical impact.

The investigation of materials from patrimonial objects is included in the requirements of Liubliana Declaration of European Community (2008) concerning the cultural heritage. The results obtained in this domain and the elaborated procedures are useful to museum custodians, restaurateurs and conservators of patrimonial objects.

Creation and development of an accredited service of thermal analysis

Laboratory is accredited RENAR having the CREDENTIAL CERTIFICATE No. LI 685/2008. Laboratory offers services of evaluation of thermal behavior of products and materials evaluated by the thermal analysis techniques and performed according to the following procedures:

- INCDIE ICPE-CA Procedure PI-01: “Determination of the thermal behavior of solid materials and products by simultaneous thermal analysis techniques (STA): thermogravimetric analysis + differential thermal analysis (TG+DTA) and thermogravimetric analysis + differential scanning calorimetry (TG+DSC)”;
- INCDIE ICPE-CA Procedure PI-02: “Determination of the thermal behavior of solid materials and products by differential scanning calorimetry (DSC)”;
- INCDIE ICPE-CA Procedure PI-03: “Determination of the thermal behavior of solid materials and products by dilatometry”.

Accredited determinations were performed for both external customers and some laboratories from INCDIE ICPE-CA.

Interdisciplinary initiatives

In the aim of investigation of materials and products with specific applications, the Laboratory initiated and co-operated with experts from different domains: research, electric industry, energy production, pharmaceutical industry. For example, the results of the analysis performed in our Laboratory were used for qualification of some electric cables.

The evolution of the human resources

For the good performance and development of the Laboratory, young researchers having PhD were engaged in the last 4 years.

Self assessment Report

Laboratory for Micro and Nano Electromechanical Testing

The history of LMNEM started in 2007 as a natural necessity in order to continue and advance the research in the field of micro and nano electromechanical systems and also to help the research in other fields in need of reliable measurements.

As a result of this necessity, two measuring systems were bought and installed, a LASER interferometer and an optical VEECO (Mirau interferometer microscope) profilometer. The first allows for high precision measurement of linear displacement and the second, the characterization of surface features for various samples of material.

As any measurement results need to be certified, the laboratory is currently in the process of being officially accredited by RENAR (contract no. 1428/2007). For this purpose, two procedures were developed for testing ("Determination of surface roughness values and the difference of level between the various points / parts of surfaces", "Determination of linear displacement") and 21 system procedures. Finalization of this process will be followed by publication of a website presenting the services offered by the laboratory. Whenever possible, the quality of measurement procedures will be improved and there will be a constant effort towards increasing the number of services offered and the market visibility of the laboratory.

The main investigations and measuring in LMNEM laboratory in period 2007- 2011 was:

- The micro and nanoroughness of the material surfaces; piezoceramic, elastomers, polymers, carbon etc.;
- The micro and nanotopologies of surfaces for MEMS components; microchannel, microcoils, microcomb structures;
- The micro and nanothickness;
- The micro and nanoelectromechanical actuation parameters (micro and nanodisplacement, speed, acceleration), of electromagnetic, piezo, electrostrictive, magnetostriction, electrothermal actuators.

The LMNEM laboratory has the agreement procedures with similarly laboratory of UPB-Mechatronics Faculty, The National Institute of Laser Physics.

The strategy of this laboratory includes the new approaches to:

- The biological membranes and tissues micro and nanotopologies;
- The medical investigations of the bone microroughness and microgeometry;
- The collagen micro and nanostructures;
- The bionics studies on the insect static and dynamics structures.

Laboratory staff in 2007-2011 was composed of three specialists (PhD student Eng. George Zarnescu, PhD student Eng. Alexandru Catanescu and PhD. Eng. Dragos Ovezza). Currently testing is done by PhD student Eng. Alexandru Catanescu and PhD Eng. Dragos Ovezza that have scientific research activity in the MEMS / NEMS Department).

Head of laboratory
Ovezza Dragoş

Team 13

SELF-ASSESSMENT REPORT

Sfantu Gheorghe Branch - Business and Technology Incubator ITA ECOMAT ICPE-CA

In 2006 there was constituted a team formed from 5 persons in order to create a project proposal “Institutional Construction of *Technological and Business Incubator ECOMAT ICPE-CA*” in the frame of the Infratech national program in order to realize a technological and business incubator at the institute’s branch located in Sfantu Gheorghe. The proposal was successful and it was obtained the financial support being implemented in 2006-2007. During this period there were made investments in the building infrastructure to rehabilitate /modernization of buildings, rehabilitation of heating and electrical network, endowment with office furniture, computers, equipments, internet connection in order to create an environment which can help incubated SME’s in their development. After the implementation of the project at the Sfantu Gheorghe branch there was established a business incubator with a capacity of incubation of 10 SME’s, one secretarial office, one administrative office, and a meeting room. It was created a team for managing the incubator: one employee from Sfantu Gheorghe which is the project responsible (development engineer 3rd degree) who has been relocated from Bucharest to Sfantu Gheorghe and there were employed another two persons. The team managing the incubator was constituted from a scientific researcher 3rd degree with part time and three persons as full time: assistant researcher, one economist, and a technician.

The main objective of the team was attraction of new start up companies, identifying new project proposal in order to sustain the entrepreneurial environment and participation of the team to Nucleus national research projects of the institute.

The Incubator was accredited as a *Business and Technology Incubator ITA ECOMAT* by NASR in 2008 according to the decision no.9406/26.02.2008.

In the previous 4 years there were incubated 12 companies from which 5 have finished their incubation cycle. In the present there are 7 companies incubated, from which we can mention an IT company who has developed a laser show controlling software, which was used for the opening ceremony of the 2010 Olympic Games in Vancouver.

The team has won five projects in partnership with other organizations (where the contracting authority to these projects were/are NASR) in the frame of national program PNII, European Agency for Competitiveness and Innovation – CIP Competitiveness and Innovation Program, and a project in the frame of a public procurement organized by NASR. We can mention the project within CIP Program called *BisNet Transylvania*, through which the Incubator offers support services for SME’s in order to innovate and access the European market, facilitating partnership agreements with other companies abroad, and technology agreements, support from SME’s to access European funds. Through this project the Institute is a partner in the Enterprise Europe Network which is the largest business support network in the world.

The main research subject of the team is magnetism, electromagnetic modeling through which is involved in one of the institute Nucleus research project. As a result of this project is a strong collaboration with the GSI Institute from Darmstadt, where there will be implemented an international project FAIR “Facility for Antiproton and Ion Research”, where our Institute is in negotiation process for signing contract with the FAIR GmbH in order to fabricate a series of electromagnets.

One person is making his doctoral thesis on the topic of Electromagnets for particle accelerators, and one person has received the doctor diploma in ceramic materials.

One of the team member has realized a patent in collaboration whit other colleges form the institute.

The team has organized five local events for SME's with different topics on Enterprise Europe Network services, European funding, and IPR rights, internationalization.

The incubator has annual participation to the International Fair in Bucharest within *Research Show* where there were presented the Incubator services and it was promoted the Enterprise Europe Network. It has participated to the regional research show rooms organized in Brasov and Timisoara, too.

The team has participated in different trainings like IPR rights, accountability, Training workshop on technological Innovation – Beijing, China, trainings organized by EACI in the frame of EEN, internship training at IKP - Julich Forschungszentrum, Germany, project management, and quality manager.

SC 1

Self-Assessment Report Executive Staff

Operative management of the institute is provided by a national steering committee composed of the General Director and heads of departments and laboratories of the institute's organizational structure.

Naturally, the steering committee are involved and has responsibilities within the limits of liability proposed by the Director General.

It establishes:

- a) strategy of development programs for the institute;
 - b) the annual research and development program;
 - c) the income and expenses;
 - d) program of investment;
 - e) quality assurance program;
 - f) strategy of human resources;
 - g) program for health and safety;
- and measures required to achieve them.

Taking into account their professional background of the Steering Committee members, they are involved in RDI activities:

- 1 projects within SOP IEC programme (Sectoral Operational Programme "Increasing of Economic Competitiveness"), Priority Axis II - Research, Technological Development and Innovation for competitiveness, the area of intervention 2.2, Operation 2.2.1, "*Advanced research for achieving carbon materials with thermal resistance subjected to irradiation, with high life time, for sealing rings*", dar si in coordonarea unor proiecte care privesc dezvoltarea institutionala a institutului.

Astfel, in perioada 2007-2011 in coordonarea Directorului General si a echipei manageriale au fost angajate si realizate urmatoarele proiecte:

- 1 project in FP6-2004-ACC-SSA-2 "*Strengthening of the RDI potential for advanced materials and composites to enhance the performance of the electrical industry*" - INDUMAT;
- 1 project in FP7-2007-REGPOT 206 119 "*Promotion of Competence to Up-Grade the RTD Potential in Science and Technology*" - PROCUST;
- 1 projects within Sectoral Operational Programme "Increasing of Economic Competitiveness" (SOP IEC programme), Priority Axis II - Research, Technological Development and Innovation for competitiveness, the area of intervention 2.2, Operation 2.2.1, "*Modernization of the infrastructure for promotion of research potential in electrical engineering for applications in priority economic thematic areas of Romania as EU member state – PROMIT*".

Last three projects aimed both infrastructure developing and development of strategy and increase the visibility of the institute.

Within these projects were acquired over 40 equipments with a higher value of 15,000 Euro, were organized and financed about 10 scientific meetings, were organized visits of foreign teachers in our institute, were sent to the training over 50 employees, contributing such institutional development of ICPE-CA.

SELF-ASSESSMENT REPORT
Marketing Department. Technical Library

Staff list

1. Viorel-Ciprian Onica – engineer, head of group
2. Olguta-Gabriela Iosif – journalist
3. Gabriela Obreja – engineer, team member
4. Ana-Maria Bondar - physicist , team member
5. Marina Popescu - physicist , team member
6. Steliana Boghet – librarian, team member
7. Bogdan Popescu – economist, team member
8. Adina Oloeru – technician, team member

All team members are employed on an indefinite period and are involved in R&D activities. The average age of staff is 43 years.

Marketing Department. Technical Library was founded in the INCDIE ICPE - CA in 2001. Technical library currently has over 22,000 volumes of books and publications and 27 subscriptions to IEEE for which the institute has annual subscription.

In 2007-2011 periods the institute participates in organizing of activities and writing of promotional materials for these events:

INCDIE ICPE-CA as organizer:

1. Electromagnetic Bio-Compatibility Workshop: characterization methods and material protection, Timisoara – 2007, Curtea de Arges – 2008;
2. URB-CORR International Conference "Study and control of corrosion in the perspective of Sustainable Development of Urban Distribution Grids", Cluj Napoca – 2007, Baile Felix – 2008;
3. The 5th National Conference "NEW RESEARCH TRENDS IN MATERIAL SCIENCE" ARM – 5, Sibiu, 5 to 7 September 2007;
4. Seminar JINR-Romania, Physics study neutron nuclei, condensed status and life sciences, Baia Mare – 2007, Targoviste – 2011;
5. Workshop of Electromagnetic Compatibility CEM, Baia Mare – 2007, Predeal – 2008, Constanta – 2009, Odorheiu Secuiesc – 2010;
6. Patent, instrument and engine of technological development, Bucharest, 2007;
7. Electro Scientific Community - an open community for the Future - Strategies and Policies in Scientific Research in the Field of Electrical Engineering, Seventh Edition, Bucharest, 2007;
8. Round table "Results in the field of materials research and advanced multifunctional nanoparticles doped with silver", Bucharest, 2008;
9. ECOMAT International Conference 2008 - Ecological Materials and Technologies, Bucharest, 2008;
10. Seminar "The History of Romanian electrical engineering", Bucharest, 2008 and 2011;
11. Seminar "Methods of Investigation and Measurement in MEMS and NEMS", Bucharest 2008 and 2011;
12. Workshop with international participation "INNOVATION AND EVOLUTION BY R&D - STRATEGIC PARTNERSHIP SME's", first edition, Bucharest, September 10 to 12, 2009
13. Workshop "The 27th HESR Consortium Meeting", 25-26.08.2009, INCDIE ICPE-CA headquarters
14. The 27th session HESR consortium, with presentations by the project partners about the current situation and progress of the project FAIR in HESR (High Energy Storage Ring), ICPE-CA headquarters INCDIE, Bucharest, 27-28 aug.2009

15. BLACK SEA Renewable Energy Forum, November 8 to 10, 2010, Bucharest
16. WATER QUALITY Workshop, 9 to 11 September 2010, Bucharest
17. "Green Energy" - Workshop Romania & China, 28-29 June 2011, Bucharest
18. Workshop "Innovation and Technology in INCDIE ICPE-CA", Bucharest, October 6, 2011

INCDIE ICPE-CA as co-organizer:

1. National Conference and Renewable Energy Sources CNSNRE, Bucharest 2007 - 2011
2. Romanian electrical engineering in European perspective, Bucharest, 2007;
3. Academic Days of ASTR, 10 years of existence, Bucharest, 2007
4. International Conference "Materials for Electrical Engineering" - MmdE, Bucharest, 2008
5. Scientific Session "Science applied to study the environment and materials", Targoviste, 2008
6. Conference "Diaspora in Romanian Scientific Research", Workshop "Materials for advanced energy technology alternatives. Hydrogen energy - viable solution for inclusion in the draft energy strategy of Romania during 2007 – 2020", Bucharest, 2008
7. Conference "Diaspora in Romanian Scientific Research", Workshop "Environment, energy and clean technologies in obtaining advanced materials and electrical products", Bucharest, 2008
8. ICATE 2008 - 9th International Conference on Applied and Theoretical Electricity, SCC11 - 11th Symposium on Cryoelectrotechnics and Cryogenics, Craiova, 2008
9. Researchers NIGHT (NIGHT researcher), Bucharest, 2009 - 2010
10. National Conference of Biomedical Engineering INGIMED, edition X, Bucharest, 2009
11. First workshop of radiotherapy „RADIOTHERAPY WITH NEUTRONS, PROTONS AND CARBON IONS BEAMS, INTER DISCIPLINARY AND MULTI DISCIPLINARY R&D” organized by Romanian Society of HADRONTHERAPIE, Predeal, 2009
12. Workshop "Nanotechnology Standardization Development", Bucharest, 2010
13. The 3rd joint seminar JINR-Romania on Neutron physics for investigations of nuclei, condensed matter and life sciences, Targoviste, 2011
14. "RES-2011" Workshop with international participation "The Future of Renewable Energy Sector" , Constanta, 2011

National and international trade fairs and exhibitions at which INCDIE ICPE-CA attended:

International fairs and exhibitions:

1. International Industrial Trade Fair HANNOVER MESSE – Germany, Hanover - Germany, 2007 – 2011;
2. The "35th International Exhibition of Inventions, Techniques and New Products", Geneva - Switzerland, 2007 – 2011;
3. The second edition of the European Research and Innovation Exhibition in Paris – France, 2007 - 2008;
4. International Technical Fair in Jilin – China, 2007
5. International Salon of Inventors in Croatia – ARCA, Zagreb - Croatia, 2007 – 2008;
6. The 56th International Salon of Brussels - EUREKA, Brussels - Belgium, 2007 – 2011;
7. International Technical Fair of Composite Materials, Tehran - Iran, 12 - 15.02.2008;
8. IRAN OIL SHOW Fair, Tehran - Iran, 16 - 20.04.2008;
9. Tehran International Industry Fair (TIIF), Tehran - Iran, 6 to 9 October 2008;
10. The twelfth edition of International Exhibition of Inventions, Scientific Research and New Technologies INVENTIKA 2008, Complex Exhibitions Centre - Bucharest, October 7 to 11, 2008;
11. Research Exhibition 2008, Bucharest, October 7 to 11, 2008;
12. International Invention Fair Kuwait 2008, Kuwait - Iraq, 9 - 13/11/2008;
13. International Electronic Fair 2008, Munich - Germany, 11 - 14.11.2008;

14. China International Nuclear Power Industry Expo 2009, Beijing, 2 to 4 September 2009;
15. BIOTECHNICA 2009, Hanover, Germany, 6 to 8 October 2009;
16. World exhibition "Shanghai 2010", China, 2010;
17. International Exhibition for Ideas – New Inventions – Products, iENA 2010, 2010, Nuremberg, Germany
18. Defence & Security LAAD 2011, Rio de Janeiro, Brazil, 12 to 15 April 2011
19. Romanian through EuroProgress, the seat of Parliament Brussels, Belgium, 23-26 May 2011

National fairs and exhibitions

1. Third Edition of Technical Fair - Timisoara, February 14 to 17, 2007
2. 2nd edition of Arad Technical Fair 2007, 24 to 27 May 2007
3. Research Show 2007 - 2011, Bucharest
4. INVENTIKA 2007 - 2011, Bucharest
5. International Salon of Inventions "PRO INVENT", 2008, Cluj-Napoca
6. Regional Research Show, 2008, Slobozia
7. Regional Research Show, 2007 - 2008, Galati
8. Regional Research Show, 2007 - 2008, Brasov
9. Regional Research Show, 2008, Timisoara
10. 2nd edition of Regional Research Show, 2007 - 2011, Alexandria
11. Regional Research Show, Calimanesti – Caciulata, 2007 - 2010
12. Regional Research Show, 2007 - 2008, Bacau
13. Caravan of Innovation, project initiated by the National Authority for Scientific Research (ANCS) aiming to increase the competitiveness of Romanian companies using national research results.
14. The 21st edition of the International Dental Exhibition DENTA 2009, Bucharest - ROMEXPO, 23 to 25 April 2009
15. Environmental Exhibition organized by CCIA Calarasi, 2009
16. Exhibition "Technology and Equipment for Renewable Energy", Slobozia, Ialomita county, 2010

The *Office for Management of Knowledge and Information* within *Marketing Department* worked with the media to achieve some shows or articles in the media for highlighting products ICPE-CA, namely: TVR, TVR International, TVR2, Radio Romania Cultural, Radio Romania News, TVRM, the newspaper "Universe Engineering", "Science and Technology" magazine, "Market Watch" magazine, newspaper "Evenimentul Zilei", the newspaper "Graiul Maramuresului", newspaper "Informatia Zilei", newspaper "Gandul", Top Business, National Courier, Dolgaink, Bursa, economist.ro, bursafinanciara.ro, Business Point, Business Adviser, Romanian Times, cotidianul.ro.

For future, team aims to promote the achievements of the institute not only by organizing scientific conferences, fairs and patents presentations, but also by organizing, together with CTT and ITA ECOMAT, of products and technologies presentations for technology transfer.

To access on-line other scientific news, other than those located in our Technical Library, the team will access ANELIS project.

5 KW FUEL CELL BASED INTEGRATED ENERGY MODULE – MENER-5

CONTRACTING AUTHORITY	Executive Unit for Financing the Higher Education, Research, Development and Innovation (UEFISCDI)
CONTRACT NO.	21-034 / 2007
PERIOD	18.09.2007 – 10.12.2010
COORDINATOR	National Institute for Research and Development in Electrical Engineering INCDIE ICPE-CA
PROJECT DIRECTOR	Dr. Eng. Gimi A. Rimbu
CONSORTIUM PARTNERS	P1 - Politehnica University of Bucharest P2 - SC ROSEAL SA Odorheiu Secuiesc P3 - SC CHIMCOMPLEX SA Borzesti
PROJECT VALUE	1.285.430 Lei from which:
BUDGET	1.175.430 Lei
CO-FINANCING	110.000 Lei
WEB PAGE	http://www.icpe-ca.ro/ro/mei-5kw
SUMMARY	<p>The purpose of this project was the development of the premises of an innovative and competitive partnership between the participant R&D units (INCDIE ICPE-CA and UPB), the SME partner (SC ROSEAL SA) and the industrial partner (SC CHIMCOMPLEX SA), in order to land and create a new area of competences in the field of fuel cells based integrated energetic systems. Especially, the project was proposed to develop new knowledge in the design and construction of an integrated energetic system, with a power of up to 5 kW, based on fuel cells. The common activities within the partnership have covered multidisciplinary areas such as: technology (S&T activities), management (coordination activities), communication (dissemination activities), intellectual property (patenting activities) and knowledge transfer (technological transfer activities). These activities have determined the achievement of a professional maturity as well as the independence and diversity in the scientific approach of the involved researchers.</p> <p>The project was structured based on some general objectives as well as on scientific and technical ones, thus the quantification and measurement of the project success rank being possible. At the same time the project presented a special approach being designed on a closed circuit scheme concerning the results development and capitalization between the participant partners: ► developing technology and know-how (INCDIE ICPE-CA and UPB) ► potential for know-how and technology transfer (SC ROSEAL SA) and ► potential for product assimilation (SC CHIMCOMPLEX SA).</p> <p>Besides of the new knowledge and technology development, the project led to some special results which are determined by the synergy of the developed S&T activities: ► Increasing the research performance of INCDIE ICPE-CA and UPB (<i>3 products developed; 2 patent applications; 2 ISI publications</i>); ► Stimulating the involvement of the private sector to the R&D activities in the project (<i>3</i></p>

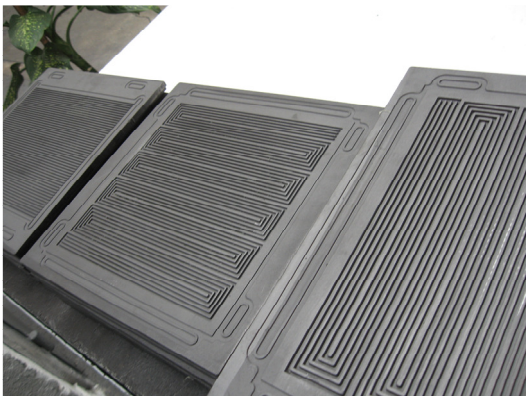
	<i>technological transfers achieved</i>) ► Increasing the institutional capacity and scientific recognition of INCDIE ICPE-CA in and around the country, fact that led to : (1) sustaining some promotion and dissemination activities by organizing conferences and work-shops (<i>3 organized conferences / work-shops</i>); (2) widening the partner portfolio and access to some international programs for attracting funds (<i>2 European projects proposed and financed</i>).
GENERAL OBJECTIVES	<p>OG1. To increase technical competences and promote the know-how and technological transfer in the field of energy, under high quality and safety in energy supply;</p> <p>OG2. To expose researchers to industrial and entrepreneurial cultures and to stimulate the partnerships in order of developing new products and clean technologies such as fuel cell technology;</p> <p>OG3. To provide the researchers with complementary fundamental underlying scientific skills to design, test, optimize, model and analyze the performance of fuel cell based energy module;</p> <p>OG4. To develop skills which enable researchers to become more effective in communication and dissemination;</p> <p>OG5. To develop the social, ethical, scientific and entrepreneurial skills and to enable the researchers to approach the issues of a lasting development of fuel cell technology;</p> <p>OG6. To promote the use of fuel cells for applications in remote locations, at local households, communities, commercial and industrial communities;</p> <p>OG7. Promotion and dissemination of new gained knowledge regarding the fuel cell technology to the scientific community, SME-s and industrial organizations in order to promote the know-how and technological transfer;</p> <p>OG8. Contribution to the strategy of training young Romanian specialists in the alternative and renewable energy sources field, with the aim of increasing the R&D competitiveness and lasting development in the field, in order to achieve new and innovative technologies and products.</p>
S&T MAIN OBJECTIVE	Designing and achieving a prototype of 5 kW integrated energetic system, based on fuel cells
PROJECT NOVELTY ELEMENTS	The innovative nature at national and international level consists in the development of a cogeneration integrated energetic module, based on a fuel cell stack with PEM type protons changing polymeric membrane, developing a total power of 5kW, from which 1,8kW maximum electric power and 3,2kW maximum thermal power.
PROJECT FINAL RESULT	PROTOTYPE of 5 kW integrated energetic system, based on fuel cells.
RESULTS BENEFICIARY	SC ROSEAL SA – Project results beneficiary by Technological Transfer
APPLICABILITY POTENTIAL IN ECONOMY	<ol style="list-style-type: none"> 1. Stationary applications – Hydrogen based electro-thermal station (230V / 50Hz / 1.8kW_e + 3.2kW_t); 2. Education – Students training; Practical demonstrations regarding the ecological alternative technologies of electric power production.

IMPACT	<p>Social:</p> <ul style="list-style-type: none"> • Development and implementation of an ecological energetic technology having social impact, by modifying the environmental and social well-being of urban and rural areas; • By taking over customer orders for products production and widening the activity portfolio of SC ROSEAL SA, new jobs will be opened. <p>Environmental:</p> <ul style="list-style-type: none"> • Hydrogen based energy technologies (Fuel Cell Systems) can contribute significantly to European public policy objectives for energetic security, air quality and reduction of greenhouse - gas emissions. In this context, developing innovative technologies like fuel cells technology and consequently developing hydrogen based energy systems is being crucial, if not critical.
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YOUNG RESEARCHERS PARTICIPATION	<ol style="list-style-type: none"> 1. Mirea Radu VASILESCU, ICPE-CA 2. Mihai IORDOC, ICPE-CA 3. Cristian DINCA, UPB 4. Cosmin MARCULESCU, UPB 5. George Cristian LAZAROIU, UPB 6. Raluca Mihaela APOSTOL, UPB 7. Radu Ionel OLTEANU, CHIMCOMPLEX SA 8. Daniela Cristina COPACIU, ROSEAL SA
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PROJECT RESULTS

DEVELOPED TECHNOLOGIES AND PRODUCTS:



Product 1 – Carbonic bipolar plate for PEM fuel cells



Product 2 – PEM fuel cell stack up to 5kW power



Product 3 - 5 kW integrated energetic system, based on fuel cells

TECHNOLOGICAL TRANSFERS:	<ol style="list-style-type: none"> 1. Contract for Know-How Transfer no. 141/15.01.2008 (Minutes regarding the transfer of know-how and competences no. 3941/17.12.2008) to SC ROSEAL SA referring: <i>Method for realization of the carbonic bipolar plates for PEM fuel cells</i>; 2. Contract for Know-How Transfer no. 1347/18.03.2009 (Minutes regarding the transfer of know-how and competences no. 240/15.01.2010) to SC ROSEAL SA referring: <i>Method for realization of 5kW PEM fuel cell stack</i>; 3. Contract for Know-How Transfer no. 261/18.01.2010 (Minutes regarding the transfer of know-how and competences no. 125/10.01.2011) to SC ROSEAL SA referring: <i>Method for realization of MENER-5kW product "5 kW fuel cell based integrated energy module"</i>.
PATENTS	<ol style="list-style-type: none"> 1. Patent application no. 01360/2010, <i>5kW cogeneration system based on fuel cells</i>, Rimbu GA, Borbath I., Boros T.F., Iordache I, Teisanu AA, Vasilescu-Mirea R, Iordoc M, Bara A, Banciu C, Coman D., Paraschiv T; 2. Patent application no. 01361/2010, <i>Electro-conductive material based on epoxy resins and conductive fillers for fuel cells</i>, Rimbu GA, Borbath I., Boros T.F., Iordache I, Teisanu AA, Vasilescu-Mirea R, Iordoc M, Bara A, Banciu C.
ISI PUBLICATIONS	<ol style="list-style-type: none"> 1. G. Nan, I. Stamatina, A. Andronie, S. Iordache, C. Cristescu, A. Cucu, A. Baci, G. A. Rimbu, <i>Microcellular carbon from polyacrylonitrile precursors</i>, Journal of Optoelectronics and Advanced Materials, vol.11, nr.11, p. 1788 - 1793, 2009; 2. Carmen CRISTESCU, Adriana ANDRONIE, Stefan IORDACHE, Serban N. STAMATINA, Livia Maria CONSTANTINESCU, Gimi A. RIMBU, Mihai IORDOC, Radu VASILESCU-MIREA, Iulian IORDACHE, and Ioan STAMATINA "PANI TiO₂ nanostructures for fuel cell and sensor applications", Journal of Optoelectronics and Advanced Materials, vol.10, nr.11, p. 2985-2987, 2008;
EUROPEAN PROJECTS	<ol style="list-style-type: none"> 1. FP7-REGPOT-2008-1-ctr. no. 229906, <i>Developing RTD Potential of INCDIE ICPE-CA in the Field of Hydrogen and Fuel Cell Technologies</i>, 2009-2012, value: 658.000 Euro (EU), Project Director: Dr.Gimi A. RIMBU (INCDIE ICPE-CA); 2. RO-BG Cross-border Cooperation, contract 46972/17.06.2011, MIS ETC Code: 222, <i>Romanian - Bulgarian joint cooperation for a long-term and sustainable development of the young human resources in the field of the renewable energy technologies, in order to overcome the socio-</i>

	<p><i>cultural barrier and to open common opportunities for getting a job and their employment along the cross - border area, 2011 – 2013, value: 945.837 Euro (ERDF), Project Director: Dr. Gimi A. RIMBU (INCDIE ICPE-CA).</i></p>
<p>ORGANIZED CONFERENCES / WORK-SHOPS</p>	<ol style="list-style-type: none"> 1. The 1st Workshop with international participation “<i>Innovation and Evolution by R&D – SME-s Strategic Partnership</i>” 10 – 12 September 2009, Bucharest, Organizer INCDIE ICPE-CA; 2. National Conference of New and Regenerable Energy Sources, CNSNRE 2008, 23-25 Oct 2008, Co-organizer INCDIE ICPE-CA; 3. Exploratory Workshop under the care of ANCS with topic ENERGY: Advanced materials for alternative energetic technologies. Hydrogen based energy – viable solution for including Romania in the energetic strategy project between 2007 – 2020; 17 – 19 September 2008, Organizer INCDIE ICPE-CA.
<p>PAPERS</p>	<ol style="list-style-type: none"> 3. Gimi A. Rimbu, I. Borbath, T. Boros, I. Iordache, A. Teisanu, Fuel Cells for the Stationary Applications, National Conference of New and Regenerable Energy Sources, CNSNRE 2008, 6-10 Oct 2009; 4. Gimi A. Rimbu, I. Borbath, T. Boros, I. Iordache, A. Teisanu, Fuel Cells for the Stationary Applications, The 1st Workshop with international participation “Innovation and Evolution by R&D - SMEs Strategic Partnership” 10 – 12 September 2009, Bucharest 5. Gimi A. Rimbu, Fuel Cells for the Stationary Applications, eHydrogenia H2_FUEL_CELLS_MILLENIUM _ CONVERGENCE Conference 2009, 21-22 Septembrie 2009, Bucharest 6. Gimi A. Rimbu, Interest and Expertise in the Fuel Cell Technology at INCDIE ICPE-CA, 17 – 19 September 2008, Organizers: Dr.ing. Gimi A. RIMBU, Dr.ing. Elena ENESCU (INCDIE ICPE-CA) 7. Rimbu G.A., Chitanu G.C., Pirvulescu V., Stamatin I., Borbath I., <i>Alternative conducting polymers for PEMFC technology</i>, Excellence Research – A Way to Innovation Conference, Proceedings Pag. 88-1 / 88-6, Editura Tehnica, ISSN 1844-7090, 2008; 8. Olariu Nicolae, Rimbu Gimi A., Dragomir Florin, Olteanu Liviu, Mantescu G, <i>Adaptive PV grid connected system with storage capabilities</i>, Excellence Research – A Way to Innovation Conference, CD Proceedings Pag. 195-1 / 195-6, ISSN 1844-7090, 2008; 9. Iordache I., Teisanu A., Rimbu G., Dumitru I., Calinoiu C., Popa I., <i>Fuel Cell Based, Hybrid Energy Module of 100w for Electronic Mobile Applications</i>, Excellence Research – A Way to Innovation Conference, CD Proceedings Pag. 323-1 / 323-6, Editura Tehnica, ISSN 1844-7090, 2008. 10. Lăzăroiu G., Tântăreanu I., Itoafă M., Alexandru C., Gusti A., Teacă R., <i>Power plants personnel training with 300 mw generator simulator</i>, The 5th International Seminar on the Quality Management in Higher Education, Tulcea, Romania, June 12-14 2008. 11. Lăzăroiu G., Itoafă M., Alexandru C., Gusti A., Iohan O., Bolborici D., <i>Training systems for the speciality personnel of 400kv and 220kv electric substations</i>, Proceedings of the 5th International Seminar on the Quality Management in Higher Education, Tulcea, Romania, June 12-14 2008